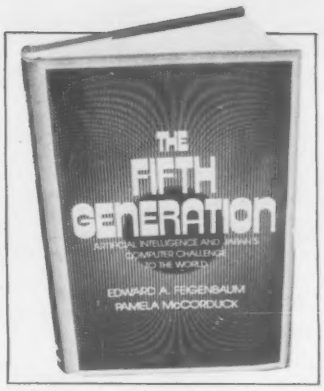
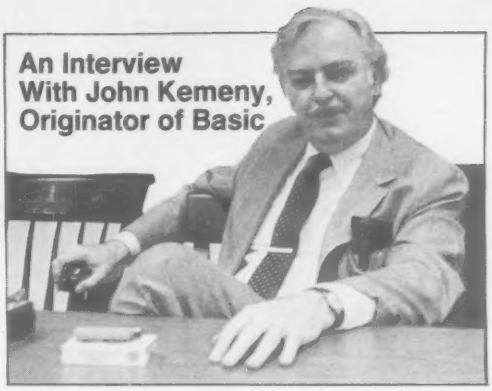
CW
MI48106UIVYMUIVYM FCWB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

Depth
s Week:
oking Ahead,
oking Back





COMPUTERWORLD

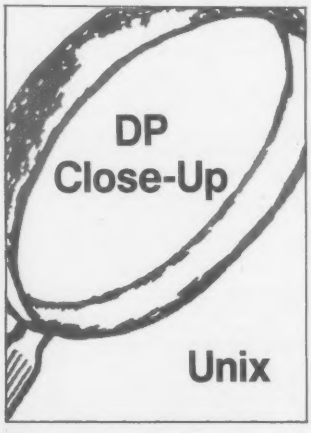
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Framingham, Mass. and additional mailing offices ©1983 by CW Communications/Inc.

NEWSPAPER

$1.50 a copy; $44/year | May 16, 1983 | Vol. XVII, No. 20



Bell Software Still a Center Of Controversy

It is refreshing to see something designed with such elegance and simplicity.
— Robert Rosenschein, a consultant in Silver Spring, Md.

I think you would be hard pressed to find a programmer who used it who didn't really like it.
— Sandra I. Heiler of The World Bank's Information Resource Management Department in Washington, D.C.

By Lois Paul
CW Staff

Mention the Unix operating system in the midst of a group of believers and you will receive an assortment of verbal bouquets like the ones above.

About 3,000 such Unix proponents flocked to San Diego in January for the Unicom conference, co-sponsored by Unix/Usr/Group (the commercial users group) and the Software Tools Users Group. Half that number of attendees had gone to the same conference six months earlier.

(Continued on Page 8)

Today's the Day: NCC Opening On West Coast

By Cheryl M. Gelb
CW Staff

ANAHEIM, Calif. — This year's National Computer Conference, opening here this morning, will be a true three-ring circus as more than 635 vendors display their wares in three locations — the Anaheim Convention Center; the center's parking lot, where six temporary buildings have been erected; and in the Disneyland Hotel Convention Center.

The box office for the biggest extravaganza staged annually by the U.S. computer industry — it is expected to draw 130,000 people this year — opens at 7:30 a.m. This year's NCC is notable for several reasons: It is the 10th annual conference in the National Computer Conference's 32-year history (previously, the show was held twice a year); it will offer the biggest exhibit floor yet (more than 320,000

(Continued on Page 6)

Magnuson M80 Tops Datapro '83 Ratings

By Ed Scannell
CW Staff

DELRAN, N.J. — Proving the adage that no one appreciates you until you're gone, mainframes from Magnuson Computer Corp. — the plug-compatible vendor that filed for Chapter 11 bankruptcy protection two months ago — finished first in terms of overall satisfaction today when Datapro Research Corp. released its "1983 User Ratings of Computer Systems."

Machines from Digital Equipment Corp., which came in fourth last year, placed second this year. Like last year, Amdahl Corp.'s systems came in third.

Mainframes from Control Data Corp. finished last, breaking Honeywell, Inc.'s three-year streak in that position.

While only 19 users of Magnuson's M80 series responded to the survey compared, for example, with 126 users of the IBM 360, they awarded their systems consistently high marks in categories such as ease of operation, ease of programming and system reliability. In addition, 95% said they have no plans to replace or upgrade their M80s over the next year.

For the second year in a row, all but one manufacturer of IBM plug-compatible mainframes were rated higher than IBM itself. Besides Magnuson in first place and Amdahl in third place, National Advanced Systems, Inc. came in fourth in user ratings, finishing one notch higher than IBM.

IPL Systems, Inc., the fourth PCM manufacturer whose processors were rated in the survey, came in as No. 6, closely following IBM.

(Continued on Page 76)

Charts With User Ratings of Specific Mainframes: Pages 77 through 79
Next Week: Minicomputer Users Rate Their Machines

NAS Unleashes Three 3083 Rivals

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems, Inc. last week expanded its IBM-compatible processor line with three IBM 3083-class mainframes that reportedly provide 20% greater price/performance benefits than the industry giant counterparts.

The Advanced System (AS)/8000 series machines were introduced simultaneously with NAS' Model 7380 disk subsystem, which reportedly offers basically the same performance features as the IBM 3380 for a 20% lower price (see story on Page 4).

Comparable in processing power to the low end of NAS' existing top-of-the-line AS/9000 mainframe family, the AS/8000 series consists of the AS/8040, 8050 and 8060.

The bottom-of-the-line AS/8040 provides 10% to 20% more performance than IBM's 3083E for roughly the same price, an NAS spokesman said. The 8050 and 8060, by contrast, reportedly equal the processing power of the 3083B and 3083J, respectively, and cost about 20% less than their IBM equivalents. NAS rates the AS/8050 as 25% to 30% more powerful than the 8040 and 25% to 30% less powerful than the 8060.

Presently, the AS/8000 machines emulate the 3083 family only in the 370 series mode. But by the end of the first quarter of 1984, the NAS processors will be available with an optional Extended Architecture (XA) feature, the spokesman said.

The addition of XA microcode will reportedly allow the AS/8000 to support 31-bit addressing, expand beyond 16 channels and operate concurrently in both the 24- and 31-bit addressing modes.

All three AS/8000 family members support data streaming, MVS/SP Assist and Virtual Machine Assist,

(Continued on Page 4)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg. U.S. Pat. Off.

Editor John C. Whitmarsh
Managing Editor Rita Shoor
News Editor Cheryl M. Gelb
Technical Editor Timothy J. Scannell
Senior Editors:
Software Lois Paul
Communications Phil Hirsch
Bruce Hoard
Systems Ed Scannell
Office Automation Bruce Hoard
Industry Bill Laberis
Features George Harrar
Writer/Analysts: Marguerite Zientara
Tom Henkel
Senior Writer: Jim Bartimo
Staff Writers: Paul Gillin
Katherine Hafner
Patricia Keefe
Staff Writer/Photographer: Susan Blakeney
Correspondents:
New York Bob Johnson
Washington, D.C. Jake Kirchner
West Coast Robert Batt
Jeffry Beeler
Features Coordinator: Barbara Van Scoyoc
Chief Copy Editor: Donovan White
Assistant Chief Copy Editor: Kathie Gow
Copy Editors: Dave Bouffard
Bruce Crane
Patti Hartigan
Betsy Morse
Deborah Scaduto
Thomas Schmidt
Charlotte Ziems
Editorial Assistants: June Fettig
Joyce Furia
Mary DeCristoforo
Contributors:
Education J. Daniel Couger
Human Connection Jack Stone
Lecht on Science Charles P. Lecht
Softline Werner L. Frank

SPECIAL PUBLICATIONS
Computerworld Extra!
Editor John C. Whitmarsh
Computerworld OA
Editor Ann Dooley
Staff Writer Glenn Rifkin
Copy Editor Nancy Fleming
Computerworld Buyer's Guides
Editor Marcia Blumenthal
Copy Editor Rick LePage

Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

OTHER EDITORIAL OFFICES & SALES OFFICES:

New York: Suite 7G, 401 East 80th St., New York, N.Y. 10021. Phone: (212) 570-2135.

West Coast: 257 Lytton Ave., Palo Alto, Calif. 94301. Phone: (415) 328-8064.

Washington, D.C.: 880 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6.

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 34-90-61. Telex: 5215350.

France: Patrick Morel, Le Monde Informatique, 42, Avenue Montaigne. 75008 Paris. Phone: 720.65.66.

Japan: Mr. Shohei Kurita, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882. Telex: 252-4217. Esteban H. Yamada, Tokyo Representative Corp., Yamaguchi Bldg., 2-12 Kanda Jimbo-Cho, Chiyoda-Ku, Tokyo 101. Phone: (03) 230-41178. Telex: J26860

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133. Telex: SECCO AA25468.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85, 231-23-86, 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Marnfeldt, Computerworld/Sweden, Nova Media AB, Vartavagen 55, 11538 Stockholm.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l, Via Rosellini 12, 20124 Milano.

Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-0010-4841) is published weekly, except February (5 issues), April (5 issues), May (6 issues), June (5 issues), August (7 issues), September (5 issues), October (7 issues), November (5 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1983 by CW Communications/Inc. All rights reserved.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. **ISBN 0010-4841/82 $3.00 + $.00**

$1.50 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $265 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP MCC MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

IBM Tax Change Not a Surprise

By Tom Henkel
CW Staff

RYE, N.Y. — A decision by IBM earlier this month to stop offering investment tax credits to its customers on rented and leased hardware — in effect raising its hardware rental and lease prices — came as no surprise to IBM users and consultants contacted last week.

In fact, at least one consultant observed that IBM may have set a standard for other vendors.

IBM's change in its investment tax credit policy — which goes into effect Jan. 1 — applies to eligible hardware leased directly from IBM on rental and lease agreements, model conversions, IBM's Pilot Test Plan Agreements and the Series/1 Special Test Agreements.

Investment tax credits are incentives offered by the government to encourage companies to use new equipment. The credits can range from 6% to 10% of the purchase price, depending on whether the equipment is depreciated over five or seven years, according to William Easterbrook, an analyst with New York-based Kidder, Peabody & Co.

IBM will offer the tax credits to customers who rent or lease hardware only if they agree to purchase that hardware within six months. Otherwise, the only way users can get tax credits from IBM (aside from an outright purchase) is to enter a term lease through the IBM Credit Corp. or organizations that have distribution agreements with IBM, the industry giant said. The term leases, observers said, are recorded as sales by IBM.

"Users should definitely be concerned; [the change in the investment tax credit policy] is going to affect them somehow," Bill Neiman, a Cincinnati-based consultant on hardware purchasing, noted.

Big companies planning to make large lease and rental agreements with IBM may, through negotiation, be able to get the tax credits back in spite of IBM's official policy. But small and medium-size companies may be out of luck, according to Nieman.

"I'm sure if IBM tries this and gets away with it, it will become an industry standard," Nieman said, adding that in addition to pushing users to purchase hardware, IBM stands to make a fair amount of money by keeping the investment tax credits it now passes along to its customers.

Besides giving users another incentive to purchase hardware, Neiman said the investment tax credit policy could be an early indication that IBM is planning to make some additional large system announcements. If that is so, IBM will want to convert as many leased machines to purchased machines as possible before older machines become obsolete.

But users of IBM systems appear to be unfazed by the policy change, according to John Magee, president of KTTM, Inc. — a New York-based consulting firm. Magee noted that only a few of his clients have expressed concern about the change, and even those clients were not terribly upset. Users are not worried, Magee pointed out, because many third-party leasing firms are still willing to pass along tax credits to their customers; if users cannot find the deal they want from IBM, they simply can go somewhere else.

Another reason for the lack of concern may be that IBM's strategy to push users to buy rather than lease hardware may already have worked. Several users contacted last week said the policy change would have no effect on them because they no longer lease hardware.

Corning Glass Works, for example, usually buys hardware when it can be justified for longer than two years, noted John Parker, director of Corning's Information Services Division.

Likewise, the director of information services at a New Jersey-based chain of retail stores, who asked not to be identified, said his firm recently adopted a policy to purchase hardware whenever possible. Up until about six months ago, the firm had a policy of leasing hardware from IBM and buying it when enough purchase accrual credits had been accumulated.

This Week

IN DEPTH

The Fifth Generation ..... Follows Page 160
Interview With John Kemeny ID/27
A Micro Policy ID/35
Software Maintenance Challenge ID/41

NEWS

DP/WP Units Put Harris Into OA Ranks 4
CDC Denies Offering Sex to Lottery Officials 5
First Wangnet User Reports Smooth Sailing 6
Wangnet Beta Test Site Encounters Rough Seas ... 7
Silicon Valley Seen Unprepared for Earthquakes ... 10
Justice Moves to Block GTE's SPC Acquisitions .. 11
Crime in Chicago: Shoplifter Rampage Revealed .. 12
Adapso Split in Vote Not to Sue Big Eight Firm 14
Raises Seen Not the Best Motivational Factor 15
Senate Hears Private-Sector Support of S. 999 ... 16
AT&T to Greene: Fee Due to Competition 17
Computer Trade Marts to House Exhibits 18
New York Computer Center to Open in '84 20
Army to Test Microchip Version of 'Dog Tag' 21
Yankee Group Predicts Enhanced System/38 22
NBS Scientists Get Patent on Security System 23
NYC to Battle Traffic Jams With On-Line Cops 27
WIP Told to Apply Skill to Firm's Style 30
Mass. Medicaid Management System Stymied 33
Airline Steers Its Own Distributed System 34
Micros Seen Impacting Graphics 35
School Board Makes the Grade With System 36
Oil Firm's System Drills for Profits 37
System's Cost Bottom Line of Choice 38
Speaker Lists Ingredients of Leadership 40
Supply House Opts for Off-Site DP Service 41
Cargo Shipping Firm Stays Afloat With Micros 43
Division Finds Own System Now Feasible 45
Western Union Expanding Terminal Network 49
Appointment System Cuts Doctor 'Downtime' 50
Accounting Firm Standardizes WP Operations 51
Firm Automates Job Quotation Process 52
System Switch Cuts Costs, Time for Hospital 53
Breeder Finds System Makes Horse Sense 54
Prefab Home Supplier Nails Down DBMS 60
Control System Irons Out Firm's Problems 61
System Aids Steel Firm in Maximizing Efficiency ... 65
Firm Finds Control Systems Need Business Plan .. 67
Users Rate Their Mainframes 77

EDITORIAL

Editorial: Keep a Tighter Rein 80
Lecht On Science: DP Lawyers 81
Human Connection: We Don't Want Gimmicks 81
The Data Center: MIS Group Handling Problems .. 82
Reader Commentary: Daytime Moonlighters 84
Getting Ahead in DP: Emotional Employees 87
Reader Commentary: Micro Popularity 88
Reader Commentary: Two Faces of Micros 90

SOFTWARE & SERVICES

Study Analyzes Remote Computing Costs 91
'Genprep-1,' 'Genedit-1' Serve IBM OS, DOS 94
Management System Fits VAX-11 95
Consultants Unveil Problem Solution Package 96
Comshare's DSS Gets Graphics, Forecasting 97
Application Program Generator Out for DEC 98

COMMUNICATIONS

Growth Predicted in Packet-Switching Mart 105
Stat Mux Handles Eight Terminals 109
AED Unveils Graphics Unit 112

SYSTEMS & PERIPHERALS

Convergent Unveils 128-User Megaframe 117
Processor Ups Power of DEC Systems 120
Altos Micros Get Expanded Memory Capacity ... 121
Advanced Digital Unwraps Z80-Based Micro 125

OFFICE AUTOMATION

Graphics Software Mart on the Rise: IDC 135
WP System Monitors Purchases for Light Firm ... 137

COMPUTER INDUSTRY

IBM Gets Second Place in CAD/CAM Revenues .. 139
Sen.: U.S. Must Support R&D 139
MCI Posts Record Profits in Last Quarter 141
Federal Court Hears DP Services-Bank Debate .. 145
Software House Broadens Horizons 150
Harris Restructures Government Sector 152
Shakeout Seen for One-Product Micro Vendors .. 153
Engineers Need CAE Tools to Excel, Exec Says .. 154
Higher Performance Graphics Systems Seen 156
Mixed Reports Filed on Comdex Show Layout ... 157

ADVERTISING INDEX 206

"SHOCKING!"

The Facts of Life About Maintenance and Documentation.

(And how SYDOC can change 'em!)

Call (201) 568-9700.

SYDOC:
Structured Documentation System

In keeping with our tradition of printing "all the DP news that fits," we present *Six Unexpurgated Facts About COBOL Maintenance and Documentation:*

1. Very few programmers—male or female—have ever established a meaningful relationship with documentation. What they produce is seldom very good—and it's almost never updated.

2. The result is a generation that might be called "Orphan COBOL Programs." They may have fathers. And they may have mothers. But birth certificates they have not got!

3. The rub comes when you try to update these orphans to meet the demands of the brave new world of DP. You can try to deduce the logic of such orphans by referring to the source code. But that's a slow and dangerous business. And your name had better be Sherlock Holmes.

4. Or you can simply ask the author of the program about the underlying logic. But guess what? He or she has just left for an exciting new job in Tahiti.

5. What you're probably left with is hand-drawn hierarchical charts—a long bus ride from structured programming techniques. And if you try to insert new code without understanding the logic, watch out. You'll probably introduce so many bugs you'll never be free of the exterminator!

6. The cost to society is high. It's been estimated that as much as 80% of your entire DP budget may be going into modifying complex COBOL programs!

WITH SYDOC YOU CAN SAY GOODBYE TO ALL THAT: SYDOC is not a sort but a new and exciting Structured Documentation System for OS/VS. It takes the responsibility for documentation out of the hands of programmers and puts it on the broad shoulders of the computer. SYDOC works three ways:

1. SYDOC IS GREAT FOR MAKING MODIFICATIONS: It works like an X-Ray. It analyzes existing programs and prints out charts that tell you everything you need to know about the program's logic, hierarchical structure, variables, and relationships between statements. You can quickly and safely pinpoint code to be changed. And you're far less likely to introduce bugs because you *know* the logic.

2. SYDOC IS GREAT FOR DOCUMENTING NEW BORNS: It tracks new programs and automatically produces first-rate structured documentation. You have an accurate and concise record of every program your staff develops. A record that can never be lured away by an executive recruiter.

3. SYDOC IS GREAT FOR MANAGERS: It permits you to establish uniform, structured-documentation standards and stick to them. You don't have to nag programmers about documentation. The ball is in the computer's court.

So if you'd like to reduce the size of your COBOL maintenance budget, give us a call. Dr. SYDOC will be glad to put you on his famous "Waste Watcher" diet!

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

DP/WP Units Compatible With IBM, Wang Products Put Harris Into OA Ranks

By Bruce Hoard
CW Staff

MELBOURNE, Fla. — Harris Corp. formally broke into the office automation ranks last week when it unveiled a family of integrated word and data processing office systems that are said to be optionally compatibile with products from IBM and Wang Laboratories, Inc.

Systems in the Harris 9000 series range from stand-alone word processing and professional computing workstations to clustered computers that reportedly support multiple work groups.

Large-scale IBM compatibility comes through IBM 2780/3780 and 3270/Systems Network Architecture terminal emulation. The Harris units are capable of exchanging documents with the Wang Office Information System product line through an optional conversion utility, which Harris claimed is the first efficient communications link between IBM and Wang word processors.

The 9000 series will be compatible with the IBM Displaywriter in the near future, a Harris spokesman said.

At the heart of the 9000 series is an architecture of multiple 16-bit Intel Corp. 80186 microprocessors and a just-released multitasking distributed operating system that reportedly has a number of integral network support features.

The 9000 series workstation has a high-resolution, 15-in. display and a detached keyboard. In addition to integrating word processing and communications capabilities, each workstation can serve as a professional computer optionally utilizing the Digital Research, Inc. CP/M 86 or Microsoft, Inc. MS-DOS operating systems and applications software.

The 9000 series products unwrapped last week include:

- The 9010 stand-alone word processor, which can be used as an individual entry-level system or as a remote information processing station capable of communicating with other work groups or centralized sites. It includes a workstation, controller, rigid and floppy disk storage options (up to 16M bytes), a 40- to 55 char./sec letter-quality printer and a memory capacity of 1M byte. Its price is $9,500.
- The 9015 professional computer, which includes the same components as the 9010 but adds CP/M 86 or MS-DOS. It costs $9,300.
- The 9020 minicluster, which supports up to four devices with any mix of printers and workstations. It also supports up to 16M bytes of floppy and rigid disk storage and can have up to 1M byte of main memory. A configuration with one workstation and one printer costs $16,000. Three workstations and one printer cost $27,250.
- The 9050 cluster, which supports up to 12 devices in any mix of printers and workstations. Up to 100M bytes of floppy and rigid disk storage are available, and each workstation supports up to 1M byte of memory. The system's controller also supports up to 1M byte of memory. Prices begin at $31,500 for one workstation and one printer. A typical configuration that includes eight workstations and four printers is priced at $84,000.
- The 9060 dual cluster, designed to support up to 24 devices in any configuration. Harris said a unique feature is the redundancy offered by the tandem configuration of the 9060's cluster controllers, allowing for virtual nonstop processing. Memory capacity is up to 1M byte per workstation and up to 1M byte per controller. A typical configuration of 16 workstations and eight printers is priced at $168,250.

The Wang conversion utility costs $2,500, while the CP/M 86 and MS-DOS operating systems are priced at $2,500 each.

The 9000 series will be available in November in New York, Washington, D.C., Pittsburgh, Dallas and Los Angeles, Harris said from its Word Processing Division in Melbourne, Fla. 32901.

Harris Corp.'s 9050/9060 Clusters

NAS Unleashes Three Machines to Rival 3083

(Continued from Page 1)

the spokesman said. Only the 8050 and 8060, however, accommodate XA.

When equipped to run in the 370 XA mode, the AS/8000 will be able to support MVS/SP Version 2 and its accompanying program products, including the MVS/XA and VM/XA Migration Aids, the spokesman said. In the standard 370 mode, by contrast, the processors already support MVS/SP Version 1.3 and VM/SP.

The new processors incorporate the same chip and circuit technology as the firm's existing AS/6600- and AS/9000 series systems, which reportedly allows the systems to occupy half as much floor space as similarly configured IBM 3083s.

Though intended primarily as a replacement for the 3083, the AS/8000 is also aimed at users of multiple IBM 4341s, the source added. Many of those users reportedly are contemplating a migration from the high end of the medium-scale processor ranks to the low end of the large-scale mainframe world.

Other features of the AS/8000-series members include air cooling, which further contributes to the mainframes' small footprint, and four-way memory interleaving.

Each member of the AS/8000 processor family can be upgraded in the field to the product line's next larger model, the spokesman added.

Both the AS/8050 and 8060 require 8M bytes of main memory and expand in 4M-byte increments to a maximum of 32 bytes. The two machines also start with eight channels and support up to 24 in eight-channel increments.

The main difference between the two processors is their machine cycle times and read/write memory cycle times. A typical AS/8050 reportedly boasts a 40-nsec machine cycle and a 400-nsec memory cycle, compared to 35 nsec and 350 nsec, respectively, for the 8060.

Like the AS/8050, the 8040 also provides a 40-nsec machine cycle and a 400-nsec memory cycle. But the AS/8040 supports only 16M bytes of internal storage and 16 channels in a maximum configuration. A basic system requires 8M bytes and eight channels.

For the AS/8040, 8050 and 8060, prices begin at $1.3 million, $1.8 million and $2.4 million, respectively.

Deliveries of both the AS/8040 and 8050 start in June. The AS/8060, meanwhile, is scheduled for first customer availability during the first quarter of 1984 from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94042.

Disk Subsystem Also Released

MOUNTAIN VIEW, Calif. — At the same time National Advanced Systems, Inc. (NAS) introduced its AS/8000 family of processors, it also unveiled a disk subsystem — the Model 7380 — which is geared to compete with IBM's 3380 disk systems.

The subsystem reportedly operates with NAS' new series of processors as well as with any other IBM or IBM-compatible processor using 3M byte/sec data streaming channels.

The NAS 7380 is described as a complement to the firm's existing 7360 disk subsystem and accommodates as many as four storage units, each capable of holding 2.5G bytes of data.

A fully configured subsystem incorporates a Model 7880-3 controller plus one Model A4 disk module and three B4 storage units for a total capacity of more than 10G bytes. Access times for the 7380 average 16 msec, with a minimum of 5 msec and a maximum of 33 msec, a spokesman said.

Both the controller and the B4 storage module cost $65,000, compared to $95,000 for the A4.

Shipments of the 7380 disk subsystem will begin in August from NAS at 800 E. Middlefield Road, Mountain View, Calif. 94042.

New York Mulling CRT Regulation Bill

ALBANY, N.Y. — The State of New York is considering legislation that would regulate the use of CRTs in the work place. Introduced into the state assembly last Monday by Rep. Frank Barberos (D-Brooklyn), the bill would make provisions for the following:

- Employer-paid annual eye examinations for employees working on CRTs.
- Twenty-minute rest periods for every two hours of work on a CRT.
- Semiannual maintenance of CRT terminals.
- Adequate seating and equipment for CRT operators.
- Employee "rights," including the option for operators to suspend CRT usage during pregnancy.
- Indirect or diffused lighting and radiation shielding.

Companion Bill

A companion bill was to be introduced last week into the state Senate. If the bill is signed into law by Gov. Mario Cuomo, New York employers will have a one-year grace period after its passage in which to comply with the regulations.

Similar legislation was introduced April 20 in Massachusetts [CW, May 2].

Legislation regulating the use of CRTs in the work place is also being considered in other states, namely Connecticut, Illinois, Maine and Oregon.

CDC Denies Offering Sex to Lottery Officials

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — Control Data Corp. has strongly denied charges that it offered to furnish Arizona state lottery officials with prostitutes in an apparent effort to influence the awarding of a $13 million gaming systems contract.

The denial is contained in a $5 million defamation lawsuit that CDC has filed against Arizona Lottery Commission Chairman Jack L. LaSota and an unnamed associate. Filed April 28 in U.S. District Court, the suit follows recent allegations that CDC offered to procure sexual services for state lottery officials while they were visiting the company's Ticketron, Inc. subsidiary last fall.

The visit to the Rockville, Md., facility came at a time when CDC was hotly pursuing a systems contract that calls for the installation of approximately 500 lottery ticket-dispensing terminals.

Scheduled to be housed in various retail establishments throughout the state, the terminals will form part of a network that will automate Arizona's currently manual lottery operation.

Although the suit names him as a defendant, LaSota vigorously denied ever having accused CDC of offering to provide state lottery officials with illicit sexual services. The accusation, he asserted, originated instead with a member of the Arizona Lottery Commission's evaluation committee, whose mission is to analyze proposals for the gaming systems contract and inspect potential vendors' facilities.

"No one, not even CDC, has ever accused me personally of being the source of the accusations against the company," LaSota said. Asked why, then, he has been named as a defendant in CDC's defamation suit, he replied, "That's a good question. I'm afraid I don't know the answer."

During a telephone interview, LaSota last week admitted knowing the name of the evaluation committee member who claims to have been the target of CDC's alleged offer. But LaSota declined to reveal the accuser's identity.

The names of both the evaluation committee member and the CDC employee who allegedly approached him have apparently been turned over to the Minneapolis-based vendor, which last week voiced "deep concern" about the incident.

"We consider the charges against us to be false and terribly injurious to CDC, especially here in the Twin Cities area, where we have a large employee population," a spokesman at the company's headquarters said last week.

The evaluation committee member who was the object of CDC's alleged sex offer was part of the official delegation that traveled to Rockville, where the overture purportedly took place, LaSota said. As of May 10, nearly two weeks after the defamation suit was filed in federal court, CDC had yet to serve LaSota with a criminal complaint, the Lottery Commission chairman claimed.

The suit in question is said to be the second such legal action that CDC has taken recently in connection with the Arizona Lottery Commission's systems contract. An earlier suit, filed in mid-March in Maricopa County Superior Court, seeks to overturn the contract as it currently stands and force all interested vendors to resubmit their bids.

For the moment at least, the contract is being awarded to Providence, R.I.-based Gaming Systems Corp., one of four U.S. vendors that responded to the Lottery Commission's request for proposals.

CDC has protested the contract award on the grounds that it, not Gaming Systems, was the lowest of the four bidders.

LaSota, however, disputes CDC's contention and describes the low-bidder issue as complex and extremely difficult to resolve. "The question of which vendor submitted the lowest bid depends on whether the commission decides to lease or buy the terminals and on several other unknown variables, including our projected volume of lottery ticket sales," he said.

"If you assume certain combinations of variables, CDC emerges as the low bidder. But if you assume other combinations, the low bidder turns out to be Gaming Systems.

"There are simply too many variables for us to be able to say definitively that one vendor or another is the lowest bidder in all cases."

Ansi/ASC X12.3-1982 Gets OK as Standard

WASHINGTON, D.C. — Data Element Dictionary (Ansi/ASC X12.3-1982), a key standard developed by the American National Standards Institute's (Ansi) X12 Committee on Business Data Interchange, has been approved as an American National Standard by the institute's Board of Standards Review.

Copies of the new national standard reportedly will be available by July 1.

They can be ordered from Ansi, 1430 Broadway, New York, N.Y. 10018. Copies required before July 1 can be obtained by contacting the Secretariat, Ansi X12, c/o E.A. Guilbert, TDCC, 1101 17th St. N.W., Washington, D.C. 20036.

SEND US YOUR BEST AND WE'LL SEND YOU BACK ONE BETTER.

Yourdon and Advanced Training Professionals Ltd., Inc. have now combined forces to bring you the best in public training for IBM® software and operating systems. Yourdon/ATP instructors are carefully selected and have real-world experience in the specific areas of data processing which they teach. This can lead to improved productivity in your data processing department.

For measureable job performance improvement, in the areas of MVS, VSAM, CICS, IMS, DOS/VSE, send us your best and we'll send you back one better.

IMS CONCEPTS AND FACILITIES
1 DAY

July	18	New York City
August	15	Chicago
September	12	San Francisco

IMS APPLICATION PROGRAMMING WORKSHOP 5 DAYS

July	25-29	Washington, D.C.
August	15-19	Stamford
September	19-23	Houston

IMS LOGICAL DATA BASE DESIGN AND IMPLEMENTATION 4 DAYS

July	18-22	Dallas
August	15-18	New York City
September	19-22	Chicago

INTRODUCTION TO COMMUNICATIONS
3 DAYS

July	25-27	Houston
August	16-18	Anaheim
September	26-28	New York City

ADVANCED COMMUNICATIONS AND NETWORK ANALYSIS 3 DAYS

July	26-28	Boston
August	15-17	New York City
September	12-14	Chicago

MVS FOR COBOL PROGRAMMER
3 DAYS

August	22-24	Anaheim

CICS/VS COMMAND LEVEL CODING
5 DAYS

July	25-29	Dallas
August	1-5	Boston
September	12-16	San Francisco

CICS/VS MACRO LEVEL CODING
5 DAYS

July	11-15	Atlanta
August	15-19	Boston
September	12-16	San Francisco

CICS ON LINE APPLICATION DESIGN
Workshop 4 Days

July	18-21	Atlanta
August	22-25	Baltimore
September	12-16	New York City

FOCUS 3 DAYS

July	18-20	San Francisco
August	22-24	Cleveland
September	19-21	New York City

DOS/VSE FOR APPLICATION PROGRAMMERS 5 DAYS

July	11-15	New York City
August	8-12	Chicago
September	12-16	Anaheim

DOS/VSE JOB CONTROL LANGUAGE
3 DAYS

July	11-13	Boston
August	15-17	Anaheim
September	12-14	Chicago

YOURDON
1133 Avenue of the Americas, N.Y., N.Y. 10036
(800) 223-2452 (212) 391-2828
West Coast (415) 871-2800

ATP
Advanced Training Professionals Ltd., Inc.
111 East Avenue Norwalk, CT. 06851
(203) 866-6060 (203) 866-3520

First Wangnet User Reports Smooth Sailing . . .

By Bruce Hoard
CW Staff

MILWAUKEE — The first commercial user of Wang Laboratories, Inc.'s Wangnet has reported smooth sailing after linking two of 30 projected buildings.

The University of Wisconsin here has put the broadband local-area network to work on such diversified tasks as electronic spreadsheets, electronic mail, document sharing, program development and asynchronous access to remote computers.

Wangnet was first introduced almost two years ago. It employs a coaxial cable-based, tree-like bus topology, CATV hardware and a 340 MHz frequency spectrum.

Wangnet features four "bands": the Wang Band, designed to accommodate Wang devices; the Interconnect Band, for use with nonWang devices; the Peripherals Band, for Wang peripherals; and the Utility Band, for video transmission.

The University of Wisconsin is primarily using the Wang Band right now, according to Jack Duwe, director of administrative data processing. Duwe described a "pilot" Wangnet configuration supporting five Wang Office Information System (OIS) 140 processors, one Wang VS minicomputer and "around" 100 Wang Ergo 3 CRT terminals.

Implementation of the local-area network began with the installation of coaxial cable by a specialist in cable TV wiring. While wiring existing buildings with coaxial cable has been called prohibitively expensive by critics of the process, the University of Wisconsin did so without serious problems or exorbitant expense in about two months, Duwe said. The cable was purchased from an electronics supplier.

Thirty buildings on the 900-acre campus are scheduled for Wangnet connection during the first phase of implementation. Two were on-line last week and two more are scheduled to join them this week. The longest distance between any of them is four cable miles. All four are physically within 1½ miles of each other.

The network's bus backbone consists of 65,000 feet of coaxial cable. Trunk lines off the backbone run into each of the four buildings and terminate at whatever CPU or CPUs are there. Terminals within the building are linked to Wangnet via the CPUs, rather than being hung directly from the coaxial cable.

"We have chosen at this point not to lay lots of the smaller cable within the building to individual offices, since we have large numbers of terminals already installed with existing cable," Duwe explained. "There's no reason to pull that cable out and change it."

In the Computer Science Building, where there are five OIS processors, the word processing and secretarial pools are producing documents for individual authors who can access the manuscripts, even if the authors are physically linked to different processors.

One of the processors is running Digital Research, Inc.'s CP/M operating system and Microsoft, Inc.'s Multiplan. It shares that software with workstations physically connected to the other computers.

The university is running Mailway, Wang's electronic mail package, on the VS minicomputer and sharing it with OIS users via Wangband.

In addition, programmers on the VS system are physically connected to OIS systems in another building via Wangband. Wangband is also being used to access other computers on campus by using their asynchronous exit protocol.

Asked to evaluate Wangnet's performance so far, Duwe replied that Wang has done a good job of supporting the system by making sure Duwe's staff received training locally and from headquarters in Lowell, Mass.

Although the university is primarily using the Wang Band, Duwe has plans to use the Interconnect Band. Each of the 38 OIS 140s is connected to the school's IBM 3083 through two twisted-pair lines, one each for 3270 and 3780 terminal communications. Those lines may be converted to the Interconnect Band because of the increasing costs of leasing those dedicated lines from AT&T, he said.

Peripheral Band connections will be placed in buildings that currently require CPUs because they are "relatively remote" from other Wang CPUs but have few terminals connected.

The Utility Band is presently being used by the campus radio station, WHA, for videoconferencing.

Desktop Version Also Unveiled

AI Component Added to Ramis II DBMS

By Lois Paul
CW Staff

ANAHEIM, Calif. — Mathematica Products Group, Inc. will unveil an artificial intelligence-based English-language component to its Ramis II data base management system (DBMS) for IBM and plug-compatible mainframes here today at the National Computer Conference.

The vendor will also announce a full-function desktop computer version of Ramis II, a data base manager component of Ramis II for large production applications and support for French and Hebrew versions.

Ramis II English is the software component designed to comprehend and respond to single and multiple questions or directives phrased by users in everyday English. It is said to respond to requests with direct yes/no answers, to questions concerning "how many" and to requests requiring tabular or graphics reports.

Ramis II English was designed to paraphase unclear requests and ask the user to confirm its interpretation of the question or directive. It acts on requests posed in English, the English-like Ramis II Reporter reporting language or a combination of the two, the Princeton, N.J.-based vendor noted.

The knowledge base of Ramis II English includes three dictionaries:

- A general dictionary of the English language.
- Ramaster, the Ramis II active file dictionary that contains information on files and fields.
- An optional file specific dictionary that contains descriptions specific to an application or user.

A Mathematica spokesman explained that the English general dictionary, which contains synonyms, parts of speech and other information, does not have to be created by the user and is, therefore, available for immediate use when the product is installed. The file-specific dictionaries are optional and must be developed by the users.

The English language processor is offered as a fully integrated component of Ramis II and provides access to data stored in Ramis II data bases and Ramis II relations; sequential, Vsam and Isam files; and IBM's IMS and DL/1 DBMS, Software AG's Adabas DBMS, Cincom Systems, Inc.'s Total DBMS and Cullinet Software, Inc.'s IDMS. It will be released to test sites in October and is scheduled for formal release in 1984.

Until Sept. 30, the price of the component will range from $12,000 to $24,000.

Scheduled for availability during the second quarter of 1984, Ramis II for Individual Workstations initially will be available for machines based on the Motorola, Inc. 68000 microprocessor and running under Bell Laboratories' Unix operating system. This version of Ramis II reportedly will provide local operation of Ramis II using the same commands as the mainframe version of the product.

In addition, remote access and two-way data transfer will be provided between desktop and mainframe or between two desktop computers.

DBM, the new data base manager, will be introduced in the fall as the library manager for Titan, the vendor's interactive programming system. Intended to be incorporated into Ramis II early in 1984 as a replacement for the existing Ramis II data base manager, DBM is said to encompass facilities to handle large data bases and high transaction rates that are characteristic of major production applications.

On the international front, Mathematica is adding Ramis II reporting capabilities in French and Hebrew in the fourth quarter. National language support will be provided for the Ramis II system at no additional charge.

The vendor noted that its Atlas data communications monitor, designed to use the expanded tasking capabilities of IBM DOS/VSE Release 2.0, has been extended to include Vtam support and complete integration with Ramis II. Titan also will be available with Atlas and with the Ramis II release anticipated for early 1984. Titan is priced at $12,000.

The Formatted Screen Manager (FSM) for Ramis II will add FSM for Procedural Languages, which was designed to enable formatted screens to be used with programs written in languages such as Cobol and assembler. FSM for Procedural Languages is priced at $7,500.

More information on today's announcements is available from Mathematica, which can be reached at P.O. Box 2392, Princeton, N.J. 08540.

Doors to NCC '83 Open Today on Coast

(Continued from Page 1)

sq ft); and attendance is expected to break all records.

The four-day show officially begins at 10 a.m., when John P. Imlay Jr., chairman and chief executive officer of Management Science America, Inc., will deliver the keynote address on "The Information Transformation — A Study in Survival." Imlay is the first representative of the industry's software and services sector ever to deliver the conference keynote.

At the same plenary session at which Imlay delivers his keynote address, the sponsor of NCC, the American Federation of Information Processing Societies, Inc. (Afips) will present its 1983 Harry Goode Memorial Award to a winner whose name is still secret.

Computerworld *will be at NCC '83 every day. Look for the* NCC Daily! *each morning outside the door of your hotel room, at a special display in your hotel lobby or at CW's Booth N3816 in the Anaheim Convention Center.*

Complete coverage of the show will appear in next week's Computerworld.

The organization will also present two other awards. Its first annual Education Award will go to Prof. John G. Kemeny, codeveloper of Basic, formerly president of Dartmouth College and currently professor of mathematics there, and Afips' Distinguished Service Award will go to Dr. Richard I. Tanaka, president of Systonetics, Inc., which is based in Fullerton, Calif.

The first of 86 technical sessions related to the conference theme — "The Emerging Information Age: Computers, Communications and People" — begins at 1:30 this afternoon. In addition, half-day and full-day Professional Development Seminars, being held at the Hilton Inn at the Park, will cover a variety of topics in depth.

For example, today's seminars include "Learning From Failure," "Myths of the Computer Consultant," "How to Measure Performance of the DP Professional," "Computers and the Law," "Organizing the Data Processing Manager's Time" and "Integrating Word and Data Processing."

. . . But Beta Test Site Encounters Rough Seas

By Bruce Hoard
CW Staff

NEW YORK — As the first U.S. beta test site to go public with its Wangnet experience, Chase Manhattan Bank has pushed Wang Laboratories, Inc. into a future for which it was not entirely prepared, according to John Macri, Chase's vice-president of telecommunications strategies.

The world's largest bank has also been pushed, and it is discovering that a large local-area network requires its operator to act as a vendor to appease its in-house users.

The bank will make a go/no-go decision on Wangnet sometime this summer, Macri said, adding that there have been a series of delays, some attributable to Wang, in implementing Wangnet. However, he defended Wang by saying Chase presents the most difficult topological problems that could be found anywhere.

Nevertheless, "there was some late delivery of product," Macri reported. "In the overall, Wang never ever could have made the original dates, even without our own internal delays."

Moreover, "the biggest difficulty I've had is getting [Wang] to accept systems engineering aspects, that this is a network they sold us," he said. "Just as if we bought a network from New York Telephone or AT&T, we would expect them to provide us with end-to-end diagnostics and responsibility in terms of trouble and repair."

After a series of meetings on these problems, Wang is coming around to the Chase perspective, Macri said.

Macri was also critical of Wangnet's software. He said Wang has a lot of work to do with its operating systems. Improved software will make the Wang Band much more "facile" to users, he said, noting that Wang's electronic mail package, Wangmail, is not currently usable over the Wang Band without first going through the Interconnect Band.

Despite his criticisms, Macri voiced confidence in the vendor: "They're doing a great job, under difficult circumstances, of getting this thing installed. We are very confident they are going to be successful."

Dealing With End Users

When it comes to appeasing its internal users, Chase is bringing itself over to a new perspective. Macri pointed out the inconvenience the new network poses for in-house data centers that are "working just like a Swiss watch" without it.

"From a business point of view, you have to start doing all the things that the external vendor has to do — Customer support, billing, trouble center, network control, automatic network control, 24-hours-a-day, seven-days-a-week operation."

Chase is facing that challenge by establishing an organization that will provide those services internally and by trying to run Wangnet "in parallel" with existing systems.

The Chase Wangnet was ordered in June 1982, when the necessary coaxial cable was already installed in the surrounding streets of Lower Manhattan. Active work began in January of this year, and June 30 was set as a deadline for linking 13 floors in four buildings located within two miles of each other. The idea was to test each of Wangnet's four bands.

The bank is using Wangnet's Interconnect Band — designed for use with non-Wang devices — for point-to-point communications and expects it to replace 700 rented cable pairs eventually. Chase is using a data switch feature on the band which has 256 addresses, looks like a private branch exchange (PBX) and provides dial-up capabilities to terminals.

IBM Personal Computers have also communicated among themselves and to Digital Equipment Corp. VT102 terminals on the Interconnect Band through the data switch, Macri said. In total, the band has 15 point-to-point circuits and 10 terminals located in different buildings and operating through the data switch. He said there are about 150 potential internal users for the Interconnect Band.

OIS-to-OIS Tests

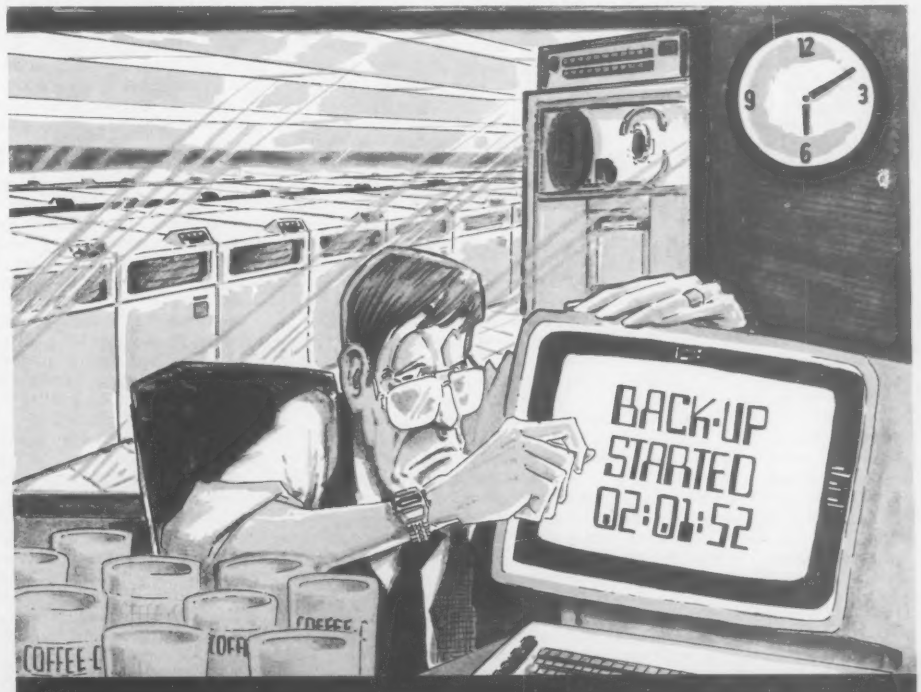
Turning his attention to the Wang Band, which is exclusively for Wang devices, Macri said the bank has tested two Wang VS minicomputer systems host-to-host with a Wangnet cable kit. This week there will be Wang OIS-to-OIS tests. "On the Wang band, we just go host-to-host," he said.

"Wherever we have Wang systems in the four buildings, they will be migrated to the Wang Band over time," he said.

The Peripheral Band facilitates Wang peripheral devices. Chase plans to bring it up with workstations and serial printers during late May or early June.

The bank has tested the Utility Band and its video capabilities for voice as well as video. "We did not test a local voice circuit," he said. "We have to investigate the cost of the equipment we'd have to get to digitize the signal, and we don't know if it's economically justifiable to replace local voice circuits.

'We believe that they've got a pretty good technology or we wouldn't be fooling around with it," Macri said.



Are your backups running into your prime shift?

Incremental Backups can reduce your backup time by 50 to 80%.

User can specify that ABR is to backup changed data sets only until a limit count is reached. At that time, ABR will interpose a full volume dump. This technique greatly reduces backup time while providing a periodic image of the entire volume.

- Automatic Volume Reconstruction
- Automatic Tracking of Backups
- Preallocation
- Unlike Device Support

FDR™
AUTOMATIC BACKUP & RECOVERY™

Available for IBM OS/VS & MVS
90 Day Free Trial

INNOVATION DATA PROCESSING
970 Clifton Ave., Clifton, NJ 07013 • 201-777-1940

Two Give Unix Kudos For End-User Applications

By Lois Paul
CW Staff

WASHINGTON, D.C. — Although many of its detractors have labeled it a difficult system to work with, Bell Laboratories' Unix operating system has been used successfully in a number of installations to support end-user applications.

The Investment Company Institute here is one case in point. Much of this organization's work involves maintaining statistical information about the 146 investment company groups that make up its membership.

The institute began running Unix on a Digital Equipment Corp. PDP-11/34 in 1980 to support end users performing text editing and other office automation functions. The move to Unix was part of the institute's decision to adopt a general-purpose system, explained Tondaleya Butler, director of membership and computer services.

Institute's Configuration

The DEC hardware and customized software to run under Unix was provided by RLG Corp., a Reston, Va.-based OEM and consulting systems house. More recently, the organization has brought in a second Unix-based computer — Computer Consoles, Inc.'s Office Power — to handle applications such as calendar management and meeting scheduling.

Although she has no programming background, Butler admitted, "I particularly liked Unix." She suggested that her lack of background may have helped the learning process: "I was like a sponge. I accepted without questions."

While the users working with the Office Power system do not deal with the operating system, the DEC PDP-11 users are working directly with "raw Unix." However, Butler said, the library of English language commands prepackaged by RLG to talk to Unix enables even unsophisticated users to do their work with relative ease.

Research assistant Ann Schafer was the first user at the institute trained to work with Unix four years ago. Her department is employing the Unix-based PDP-11 to track trends among members as well as to aggregate statistics on a weekly, monthly, quarterly and annual basis. Although Schafer said she lacks a programming background and therefore has nothing with which to compare Unix, she likes the operating system. "It has been easy."

Totally Dependent

Six of the PDP-11's 16 ports are used by the Research Department, whose staff has doubled since the Unix-based system was installed. Schafer said the department has become totally dependent on the system.

The day before she was interviewed, the system had been down and reports had to be produced manually, a process that took six people an entire day, she said.

Each Thursday the research group conducts telephone surveys of users of mutual funds and compiles statistics. This is a project it did not even attempt before installation of the system.

Another Believer in Unix

Office automation applications also provided the entrance point for Unix into the World Bank's Information Resource Management Department in Washington, D.C. After 13 years with a heavy mainframe-oriented Cobol banking background, Senior Computer Systems Specialist Raleigh J. Neal has become a Unix believer.

Unix was brought into Neal's department about six years ago as a pilot project to augment word processing. It initially ran on one PDP-11/70. Then there were three Unix-based PDP-11/70s. Currently there is a DEC VAX-11/780.

People have flocked to Unix, according to Neal, who feels Unix may be the medium for the ultimate merging of word processing and data processing. His group has used the operating system for word processing, time recording and some program development. The users are primarily secretaries and research assistants.

Neal's current task is to promote the use of Unix at World Bank with the help of consultant Mark Nodell. Neal has formed a task force to provide a proper structure and training.

Bell's Unix Operating

(Continued from Page 1)

It was at the well-attended January show that AT&T announced Unix System V, its first supported version of the operating system developed by Bell Laboratories' Ken Thompson and Dennis Ritchie in the early '70s.

The Unix operating system has come a long way since its introduction. Written in Bell Labs' C language for the Digital Equipment Corp. PDP-11 processor, Unix boasts portability that enables it to run on systems that include the 32-bit DEC VAX-11, Amdahl Corp.'s 470V/7 mainframe and the IBM Series/1, as well as 16-bit microcomputers based on Intel Corp.'s 8086 and Zilog, Inc.'s Z8000 microprocessors and Motorola, Inc.'s 68000-based 16/32-bit systems.

Unix was developed to support a multiuser, multitasking environment that gives each user full access to a host computer's resources on a time-sharing basis. It includes such features as a line printer, queuing, logon/logoff, monitor commands and file access that can be implemented as normal user programs rather than as operating system func-

Question Hovers on Whether Large Users Will Accept Unix

With its recent growth in popularity, a prime question is how Bell Laboratories' Unix operating system will impact installations that primarily run large mainframes.

Unix has been heavily used in office automation, research and software development environments. It is widely believed that Unix's movement to many 16-bit micros will increase its use in business and personal applications.

A number of larger installations have brought in Unix to handle office automation projects. Others are using it to handle software development on smaller and therefore cheaper machines.

Still other users are getting their first exposure to Unix by buying Unix-based systems through OEMs.

"Either this year or next, end users will get excited about Unix or they will not know they are using Unix. It will be built into products they are using," predicted Robert Rosenschein, president of RSR Associates, Inc., a Silver Spring, Md., consulting firm.

Major Drawing Card

Unix's portability may be its major drawing card for DP managers in big shops. Rosenschein said DP managers will view Unix as a vendor-independent environment that allows them to bring in a new technology without sacrificing their current software commitment.

"With a minicomputer, you can get the prompt and know what to type. Having the portable command language is what is so nice," Rosenschein said.

Although the DP manager may not care about the "technical elegance" of Unix, portability that allows him to transfer software from one machine to another and from one architecture to another will interest him, he added.

Multiuser Capabilities

Unix's multiuser capabilities also are spurring interest in DP installations of various sizes. Bob Marsh, chairman of Plexus Computers, Inc. and president of the Unix/Usr/Group, predicted that Unix will be the dominant force in the four- to 32-user environment within three years.

"I wouldn't have said that a couple of years ago because I didn't expect IBM and Hewlett-Packard Co. and all those people to get in the market so quickly," Marsh said. "It took six years to get into the CP/M market and only two years to get into Unix," he continued.

A third feature that should prove attractive is the availability of a great deal of software. "Some of those products are as sophisticated, or more sophisticated, than existed on the larger machines," Marsh said.

Ordinarily, this would seem surprising, he said, unless one considers the vendor independence of Unix, which makes it usable by a much larger target market. That means users "are willing to invest a lot more up front," he added.

Robert Rosenschein

Raleigh J. Neal

Sandra I. Heiler

CW Photos by L. Paul

Mark Nodell

System Still Remains a Center of Controversy

tions. Electronic mail is another capability.

"The market for Unix has gotten very serious very quickly," Plexus Computers, Inc.'s chairman, Bob Marsh, president of the Unix/Usr/Group, said in an interview last week. When Plexus was founded 2½ years ago to sell Unix-based systems to OEMs, there was some question about whether a viable market existed. "Now we have tremendous interest and bookings. The kinds of people we see right now are very large end users with a lot of big deals coming out of the U.S. government."

Not Everyone Happy

But not everyone is happy with Unix. Some have contended that little applications software has been written to run under the operating system. But Marsh disputed this, noting that most of the software written to run under Digital Research, Inc.'s CP/M operating system for eight-bit micros will also run under Unix. He also pointed out that the Unix/Usr/Group published a catalog of about 400 Unix offerings about a year ago.

"The bottom line is that there is more applications software for Unix than for any other operating system I know of," Marsh said. Conversion of much of this software to Unix was minimal, he maintained, consisting largely of adding the record locking and protection mechanisms that were missing in single-user systems to facilitate their handling multiple users.

In addition to the microcomputer software, data base systems and high-performance compilers have been converted to run under Unix on minicomputers, Marsh continued. Bridge products such as Dibol emulators are also being built for the Unix environment, he said.

Marsh speculated that approximately 10,000 Unix systems were installed by the end of 1982. "What is significant is there are people like [Tandy Corp.] and [Fortune Systems, Inc.] now shipping large numbers on a monthly basis. We could double and triple the installed base every year for a few years," he declared.

Unix also has been assailed as being difficult to use. Although its proponents feel this criticism is undeserved, they admit that Unix was designed with technical friendliness rather than user friendliness in mind.

Robert Rosenschein, president of RSR Associates, Inc., said the Unix command language shell is "not as friendly as it could be to the first-time user," but he and others pointed out that it is relatively easy to develop an alternative shell or front end to the operating system for less sophisticated users.

Many Using Unix to Develop Applications

Because of its "technical friendliness," Bell Laboratories' Unix is being used at a number of sites for program development.

At the World Bank in Washington, D.C., the Information Resource Management Department is downloading extracts of the Economic Work Group's huge data base, currently residing on an IBM 3031, to Motorola, Inc.'s 68000-based microcomputers running Unix. The micros are being used for program development and statistical manipulation of the data, according to Senior Computer Systems Specialist Sandra I. Heiler. "You are downloading interactive processing to a cheap machine," she explained.

In addition to Unix's capabilities as a development tool, Heiler lauded its built-in file management and word processing features. "It takes a lot of tasks end users have to worry about and makes them simple and easy."

Bell Labs' largest computing center, the Indian Hill Laboratory in Naperville, Ill., has been using its Unix operating system on IBM mainframes for several years to support up to 5,000 systems programmers in software development.

Initially, the lab ran Unix on a Digital Equipment Corp. VAX-11/780 and Western Electric 3B20 minicomputers. Processing also was done on three IBM 3033 attached processors, a 3033 Model S and a 3081 Model K running National CSS, Inc.'s Conversational Software System for time-sharing.

Three years ago, it became obvious that the increasing number of Unix users could no longer be supported by the minicomputers alone. The Indian Hill Lab then began exploring with IBM the possibility of transporting Unix to the IBM mainframes. Unix software basically was put on top of the IBM resident supervisor.

"The way we did it was we made the mainframe look like the same kind of environment as the mini, except much larger," explained Carl Hu, head of the Computing Technology Department. Hu stressed that the IBM version of Unix is by no means a general offering of Bell Labs.

"You can't control what you can't measure." —Tom DeMarco

A New System for Project Estimation from Yourdon Press

IT'S A FACT that nearly half of all software projects wind up behind schedule and over budget, and a full 15% of them never deliver *anything* at all. In order to be in control of a software project, managers must face a host of quantitative problems: how much time? how much money? how much risk? DP managers need a system to make effective project management a reality.

Controlling Software Projects: Management, Measurement & Estimation, by Tom DeMarco, shows today's manager how to make rational, metric-based estimates, how to track progress, and how to detect potential problems before they lead to costly overruns. *150 diagrams; appendices include sample models set, statistics primer, sample program to compute code volume; ISBN: 0-917072-32-4; 296 pages; $28.50.*

Read Barry W. Boehm's comments from the Foreword:

"Tom DeMarco's book *Controlling Software Projects: Management, Measurement & Estimation* is a very timely, helpful, and enjoyable book. . . .DeMarco's sense of humor and vast fund of corroborative anecdotes make it a pleasure to learn from him."

" . . . most software organizations are currently running short of money, or people, or both. If your organization fits one of these descriptions, this book can help you bring your software costs under better control, and . . . avoid many of the common sources of lost effort on software projects."

"One of the major strengths of Tom DeMarco's approach to software cost estimation and control is that it builds directly on his successful and widely used methods of software system specification and design, . . . which form the basis of the methodology in his previous book, *Structured Analysis and System Specification.*"

SHIPPING INFORMATION: Specify quantity per title. Coupon prices include $1.25 per book for shipping & handling. Residents of CA, NY & WA states, add applicable sales tax. **Orders must be prepaid in U.S. funds.**

Or, charge your order on ☐VISA or ☐MASTERCARD.

Card No. _____

Signature _____

Expiration Date _____

☐ Enclosed is $29.75 for each copy of *Controlling Software Projects*, by Tom DeMarco.

☐ I'm interested in structured analysis. Enclosed is $28.75 for each copy of *Structured Analysis and System Specification*, by Tom DeMarco.

☐ Please send me your current book catalog.

☐ Please put me on your mailing list for new book information.

Name: _____

Company: _____

Business ☐ or Home ☐ St.: _____

City: _____ **State:** _____ **Zip:** _____

Business ☐ or Home ☐ Phone: (___)_____

Yourdon Press, Dept. CW5/83 1133 Avenue of the Americas New York, NY 10036-6748 (212) 391-2828 (800) 223-2452

YOURDON PRESS, A DIVISION OF YOURDON INC.
1133 AVENUE OF THE AMERICAS NEW YORK, N.Y. 10036 (212) 391-2828

Expert Warns Silicon Valley Unprepared for Earthquakes

By Robert Batt
CW West Coast Bureau

PASADENA, Calif. — Computer users and manufacturers in California's Silicon Valley are completely unprepared for dealing with a major earthquake, a seismic expert here has claimed.

William Iwan, professor of engineering mechanics at California Institute of Technology, warned that unless radical improvements are made, the state could suffer massive economic dislocation resulting from an earthquake in Northern California.

His comments came in the wake of a major earthquake that devastated the San Joaquin Valley town of Coalinga in the central part of the state, causing damage worth millions of dollars.

"While there has been some attention paid to the structural design of buildings to resist earthquakes, the contents of those buildings, particularly high-technology processes and applications, have not been looked at from a seismic point of view," Iwan stated.

There is an urgent need, he asserted, to define the scope and magnitude of the problem. For example, how vulnerable to earthquakes are computers in banking institutions, where literally millions of dollars could be at stake.

Manufacturing processes used in semiconductor and disk manufacturing, he suggested, are also at risk and, if damaged, could lead to costly replacements and long production delays.

"Computer equipment is very vulnerable to seismic activity, and yet there are no more than a couple of companies in Silicon Valley who are looking to secure their computer applications from major earthquakes," claimed Iwan, who also works as a consulting engineer in the area.

"Since an enormous number of companies and people depend on computers, the economic impact of an earthquake to a company, the state and even the nation could be substantial," he added.

Silicon Valley is wedged between two major fault lines and, together with Los Angeles, is considered by geologists to be the most likely high-technology area to be affected by a major earthquake.

"The potential for a strong earthquake in the Silicon Valley is very real. It's like a fuse, the longer we delay taking action, the closer we get to the explosion," Iwan commented.

'No Relief in Sight'

Iwan's comments follow a recently issued report from the Seismic Safety Commission of California on building standards, which stated: "The downward trend in construction quality appears to be continuing with no relief in sight."

Reduced building department budgets, tight private-sector money, high interest rates and increased demands on professional and construction manpower have all led to a deterioration in building quality, the report claimed.

"Design professionals should emphasize the importance of earthquake-resistant design, plan checking, construction monitoring by professionals and independent inspection during construction. It is essential for construction budgets to include sufficient funds for such activities," the report added.

According to Iwan, who is also a member of the commission, the next step should be to regulate the use of computer equipment in highly vulnerable situations.

"We need to find out what the specific problems are, and then the commission can recommend legislation or establish codes for restricting or controlling high-technology equipment in those vulnerable environments," he said.

"Anything that is done now will save money later on. The companies that are farsighted will be those that take immediate action to ensure that their buildings and equipment stay intact if an earthquake does come," he concluded.

Wide World Photo

This was the scene in downtown Coalinga, Calif., earlier this month after it was hit by an earthquake that measured 6.5 on the Richter scale. An earthquake like that, a Caltech professor warned, would catch computer users and vendors in California's Silicon Valley completely unprepared.

ATTENTION!
DEC-10/20 Users
Don't Buy ANY Spreadsheet Until You Have Seen. . .

Now! The Excitement of Real Personal Computing; The Power and Capacity of a Mainframe. . .$2500!

Imagine magic ledger paper that can automatically maintain sums, averages, and percentages as you modify your data. That's just the beginning of what V*PLAN can do for you. Built-in report writer, algebraic expressions, five levels of help, on-screen self-paced tutorial, and the unique interactive capabilities of The Personal Mainframe* all make this the most user-friendly spreadsheet now available anywhere, micro or mainframe. On DEC's 36-bit hardware, the precision, dimensions and capacity are awesome. V*PLAN even optimizes terminal output, so you can exploit every CRT on your network, even dial-ups. VisiCalc® compatability, of course.

Decision-making made simple, because now you can watch your data in action.

Available now. Installs in 15 minutes. Price $2500 for permanent license includes first year's maintenance ($300/year).

I've made the decision! Tell me how I can try V*PLAN out.
Name
Title/Position
Company
Address
City/State/Zip
Phone

For more information, please write or call:
PSS Professional Software Support
P.O. Box 877, Golden, CO 80402, (303) 237-8763

*The Personal Mainframe, DECSYSTEM-20 & DECsystem-10 are trademarks of Digital Equipment Corporation. VisiCalc is a registered trademark of VisiCorp. V*PLAN is a trademark of Professional Software Support. VisiCorp is in no way associated with Professional Software Support.

ULTIMATE

The Hermes Saddle.
The ultimate jumping saddle.
Uncompromised design.
Formed to follow function.
Crafted for maximum performance.

In a world of look-alikes, only products of impeccable design thought, and a thorough understanding of its environment, will survive. So it is with our CDIS business applications.

CDIS is a total system for the management of Financial, Distribution, and Human Resource operations. It was designed to meet specific applications by experienced software professionals. And so, CDIS is easily understood and employed. Information management potential is virtually unlimited. It will increase efficiency, productivity, and growth rate. It is no wonder that H-P and DEC VAX users all over the nation have come to rely on CDIS.

Computer Data Corporation is dedicated to the development of software systems engineered to perform, to solve problems, to maximize capabilities and performance. It is a 28-year commitment to uncompromised excellence.

You should find out more about CDIS. Simply send us your business card, or call, and we'll forward complete details. CDc...for the total systems solution:

- General Ledger • Accounts Receivable
- Accounts Payable • Payroll • Inventory
- Sales Orders • Purchase Orders
- H-P Series 3000 Hardware
- DEC VAX Hardware.

COMPUTER DATA CORPORATION
The Business Systems Company
31344 Via Colinas, Westlake Village, CA 91362 (213) 991-4060
New York, Atlanta, Chicago, Dallas, San Francisco, Kansas City, Los Angeles.

Justice Moves to Block GTE's SPC Acquisitions

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A decision from the Federal Communications Commission (FCC) on GTE Corp.'s proposed acquisition of Southern Pacific Co.'s (SPC) terrestrial and satellite communications subsidiaries is likely "within the next month," an FCC spokeswoman said here last week.

Her comment came shortly after the Department of Justice filed an antitrust suit against GTE in U.S. District Court here seeking to block the acquisition. Simultaneously, however, Justice and GTE lawyers unveiled a proposed consent decree which, if approved by the court, would satisfy the government's concerns.

Although there is a good chance the FCC will act on the acquisition before the court disposes of the antitrust suit, any commission decision authorizing GTE to take over Southern Pacific Communications Co. and Southern Pacific Satellite Co. would be conditioned by whatever terms and conditions the court imposes, a knowledgeable source explained.

In its antitrust complaint, the Justice Department alleged that GTE, by acquiring the two SPC affiliates, would gain both the incentive and the ability to engage in behavior that is illegal under the Sherman Antitrust Act.

Specifically, GTE — which is the nation's second largest telephone carrier, serves 31 states and interconnects 13 million telephones representing 8% of the U.S. total — could deny or restrict interconnection of those telephones with competing interexchange carriers, according to the complaint.

GTE operating companies could also cross-subsidize on-line information services and other unregulated offerings with revenue derived from basic telephone service, the complaint contends. Such cross-subsidization would discourage others from offering their wares in areas controlled by GTE operating companies, Justice said.

A Major Goal

A major aim of the proposed consent decree is to "circumscribe GTE's ability, through ... the [operating companies] ... to foreclose or impair the development of competition in ... the provision of interexchange telecommunications and information services," the Justice Department said in a "competitive impact statement" accompanying the proposed consent decree. The following are the decree's major provisions:

- Information services offered by GTE operating companies would have to be separated from the company's regulated activities for at least five years. However, terminal equipment could be offered directly by an operating company. The separation requirement could be met through formation of either a separate subsidiary or "an unincorporated division maintaining separate books of account."
- GTE operating companies must provide nondiscriminatory access to all interexchange carriers and would be forbidden to offer interexchange service. However, both of these provisions are to be imposed gradually. Operating companies would have until 1990, for example, to provide equal access through end offices terminating more than 10,000 access lines each; however, some end offices equipped with electronic, stored program control switching facilities would have to provide equal access by Jan. 1, 1985.
- GTE operating companies would be barred from offering new interexchange services, and GTE could not acquire additional interexchange carriers without court or Justice Department approval.
- The Justice Department could seek further relief, including divestiture of the the acquired Southern Pacific companies and/or the GTE operating companies, if GTE violates the consent decree.

Briefings Cover Planning for XA

STAMFORD, Conn. — The Techtran subsidiary of The Gartner Group, will present briefings for IBM users on "Planning for Extended Architecture (XA)" and "Data Facility Products" in New York, June 1-3, and San Francisco, June 8-10.

Both briefings are aimed at technical support managers, performance analysts, senior systems programmers and software suppliers. "Planning for XA" is designed to help attendees evaluate the significance of the MVS/XA announcements, analyze its true impact and cost and prepare for a smooth move.

"Data Facility Products" will tell how the new generation of data storage management software will result in improved direct-access storage device performance, evaluate the significance of the Data Facility products and analyze their effective use.

At both sites, "Planning for XA" costs $395 and "Data Facility Products" costs $495. One can attend both for $595. There are savings for registrations before May 23 and for multiple attendees.

Techtran is located at 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

NOW BELL'S NEWEST TEAM IS FREE TO SELL YOU THE LATEST BELL BUSINESS PHONES

"We have the answers for the data management industry."

We're American Bell. The newest addition to the Bell System. In Bell's tradition of helpful service, we apply the latest Bell technology to the needs of your business.

And we're free to bring you an important new advantage. A choice of payment options for equipment, including outright purchase (with or without financing).

So if you're moving, growing, changing, need smarter phones, or just want information, just mail in the attached coupon.

We can show you how businesses just like yours use the latest phone systems to save time, trouble and money. Phones developed by Bell Labs and built by Western Electric.

And, of course, we also offer Bell trouble-free service. The kind of dependable service that has "kept America talking" for the past century.

3 FREE WAYS WE'LL HELP YOU NOW

Send for our free 3-part kit:
1) "How to Make Phones Work Harder for Your Business."
2) "How to Determine Which Is Best—Outright Phone Purchase or Monthly Equipment Charges."
3) "Free Analysis of Your Phone System—Measuring It Against Your Business Needs."

819M
CALL US AT 1 800 AIS-1212 Ext. 2
American Bell
P.O. Box 409
Elmsford, NY 10523
☐ Yes, please send me my free 3-part kit."
Name_____
Company_____
Address_____
City/State/Zip_____
Business Phone( ) _____
How many phones do you have?_____

THE SMALL BUSINESS CONNECTION OF
American Bell
Advanced Information Systems
An AT&T Company

Crime in Chicago: Data Base Search Reveals

By Paul Gillin
CW Staff

CHICAGO — Crime may not pay for you, but for dozens of petty thieves here it was paying quite nicely, the Chicago Police Department found recently.

As an experiment, the Detective Division last year asked the department's Data Systems Division to compile a list of people who had been convicted of 13 or more crimes during the preceding two years. To their amazement, the computer churned out the names of 38 people who collectively were responsible for more than 800 arrests. One man had been arrested 84 times.

Upon further scrutiny, the detectives found that nearly all the convictions were for shoplifting, a crime that is estimated to cost Illinois businesses more than $1 billion annually.

The department mounted a visible and successful program to prosecute these "career" shoplifters as felons by virtue of their multiple convictions.

In the past year, 15 of the chronic shoplifters have been convicted of felonies and the department is now targeting its computer application to cover a wider variety of crimes within the next two years, according to Lt. Michael F. Caccitolo, commander of the Detective Division's Administrative Division.

The computer search was the outgrowth of an innocent question posed by Caccitolo in 1981: "I wanted to know who was the most active criminal in the city of Chicago."

Even though police records were already computerized, "I found nobody could answer that."

At the detective's urging, the department sought the computerized match from its data base of 78,000 arrest records for the previous two years. The Data Systems Division was in the process of reformatting its entire file structure onto Vsam files on an IBM 3081 mainframe, and Caccitolo's request was "a fairly simple operation," according to Bob Miller, manager of systems and programming. The findings, however, were startling.

"People were finding it cost-efficient to shoplift," Caccitolo said. "They were coming into court with $8 and $12 items, and the judge wasn't going to sentence them for that. They were falling through the cracks in the judicial system."

List of Offenders

The department distributed a list of the chronic offenders to 15,000 retailers in the Chicago area. The department also mounted an internal effort to flag the career shoplifters so they would not escape judicial attention in the future.

At the same time, the detectives commissioned a similar list to be drawn up for "serious" offenders, those who had been convicted of three or more crimes such as robbery, burglary, rape, murder or carrying a concealed weapon. Again, the results revealed the extent to which a few

Dartmouth to Link IBM Micros With Host

HANOVER, N.H. — Once again the hallowed halls of Dartmouth College are housing both traditional Ivy League education and futuristic technological advancements.

The college, which has the invention of Basic (1963) and the widely acclaimed Dartmouth Time Share network (1964) to its credit, has expanded its existing computer center in the Amos Tuck School of Business Administration with the acquisition of approximately 50 IBM Personal Computers.

The Personal Computers will not only be used as stand-alone devices, but will also function as intelligent terminals hooked into Dartmouth's mainframe computers.

"We have a homegrown communications package that allows for communications between the [Personal Computers] and the mainframes," explained Associate Professor in Operations Management Dean Kropp.

"It's the closest thing to a local-area network we've got."

'Among the First'

Kropp believes Dartmouth is among the first to link IBM's Personal Computers to host mainframes in a university environment. He said the 50 computers at the business school — which result in a ratio of one computer to seven students — will be predominantly used for spreadsheet analysis and word processing by the students.

According to Paul Argenti of the school's Communications Department, almost every course at Tuck requires the use of a computer in some way, and with 50 Personal Computers, he believes the quality of the school's education will "be impressive."

The implementation of the Personal Computers is slated for this summer, and they should be be up and running for the fall semester. But with computing power going up and costs continuing to come down, Kropp foresees the process of acquiring personal computers as an ongoing thing.

"Three to four years from now, I can envision every student having an IBM [Personal Computer]," he said.

"While we do have a lot of mainframe capability here, we just can't afford to ignore personal computers."

Association For Computer Operations Managers
— Presents —

FOCUS ON OPERATIONS - III

A Conference for Computer Operations Personnel
To be held in Las Vegas, Nevada
June 13/14/15, 1983
At the Riviera Hotel

Computer Operations Managers...
Supervisors...Analysts...Schedulers...

FINALLY! a conference designed to meet your needs.

TOPICS TO BE PRESENTED AT
Focus On Operations - III

- Operations Training
- Distributed Systems
- Three-Day Work Week
- Contingency Planning
- Evolution Of Communication Modems
- Capacity Planning
- Local Area Networks
- Network Operations
- Developing A Training Budget

...and others

"Focus On Operations - III" is AFCOM's third annual operations conference. It is your opportunity to spend three days with other operations managers concentrating solely on learning more about computer operations. Three days of exposure to what other managers are doing in their operations; three days of being at a conference where not just one or two, but where every single topic presented is about operations.

"Focus On Operations - III" is sponsored by the Association For Computer Operations Managers. It is geared to the needs of the people who work in computer operations, and it is designed to keep you up-to-date with what's going on in your field.

CONFERENCE REGISTRATION FORM

Name & Title _____
Name & Title _____
Company _____
Address _____ Phone (____) _____
City _____ State _____ Zip _____

☐ AFCOM Member - $560.00
☐ Non-Member - $625.00
☐ Non-Member Registration plus membership - $675.00

☐ Payment enclosed
☐ Bill my company

Major Hardware Installed:
____IBM ____UNIVAC ____Honeywell ____Other ____

☐ Check for additional information on spouse's program

SUBMIT PAYMENT AND REGISTRATION FORM TO:
DATA CENTER MANAGEMENT SERVICES
935 S. GILBERT
ANAHEIM, CALIFORNIA 92804

Call **(714) 761-3551** for details on conference and substantially reduced room rates at the conference hotel.

Rampage of Chronic Shoplifters

people influence the crime picture.

"We found that .8% of the people arrested for serious crimes accounted for 5.1% of all arrests and that 7.5% of the people were committing 22% of the serious crimes," Caccitolo said. "If you assume they're only being arrested once for every three crimes they commit, that's a lot of incidents."

The department has not taken any action on the data base of serious offenders, Caccitolo said, but he expects an effort similar to the shoplifting watch to be launched within the next two months. The detective maintains that the tracking system is not a form of harassment, but rather an example of effective recordkeeping.

"We're not targeting these people before they're arrested, but we're identifying them. And whenever one is taken into custody, regardless of the offense, the police are going to conduct a full investigation," Caccitolo said.

CW Photo by P. Gillin

Chicago Police Lt. Michael F. Caccitolo believes the police department of the future will automate nearly all of its information resources.

System Advocated as Whodunit Tool

By Paul Gillin
CW Staff

CHICAGO — If the charge is being a little starry-eyed about technology's potential in the police department, Lt. Michael F. Caccitolo pleads guilty.

Caccitolo, commander of the Administrative Division within the Chicago Police Department's Detective Division, advocates streamlining police recordkeeping with computers. The battle is an uphill one in a city plagued by the typical urban problems of too much crime and too few resources to battle it. But little by little, changes are being made, he said during a recent interview here.

Using computers, the police department has conducted a successful program to prosecute chronic shoplifters and plans to expand the system to include serious criminals and career pickpockets . And Caccitolo believes the police department of the future will automate nearly all of its information resources.

By next January, an arsenal of 24 terminals will be deployed in area offices throughout the city for case reporting and eventually for on-line access to police data bases, according to Ronald Manka, DP director for the police department.

The on-line query system was cost-justifiable even in a time of tight budgets, Systems and Programming Manager Bob Miller said. "The real problem has been the time lag between the decentralized detective divisions and the keypunch areas downtown," he added. "Under the on-line system, the police will have access to case reports within a few hours of the time the report is filed."

First-year cost savings are estimated at $1 million, mostly from reduced legwork required of detectives. The system will include a Mathematica Products Group, Inc. Ramis II data base management system for on-line query capabilities that detectives can use.

"The department handles at least 300,000 case reports a year, and a particular detective handles each case," Caccitolo said. "In a 14,000-man department, it's often impossible for a victim to trace his detective again," particularly if the paperwork has not had a chance to move through the manual records system.

Under the planned system, a victim will be able to contact his detective immediately for information or updates on his case. Caccitolo would like to expand the filing system in future years to allow case records to be queried on-line according to a variety of fields.

Ultimately, Caccitolo would like police to be able to type a description of a suspect into a terminal and have a list of all people who have been arrested and match that description appear on a printout. Mug shots and police lineups could be recorded on videotape, he maintained, so the information could be accessed from any station.

Caccitolo admits that computer equipment is a low priority in a department strapped for funds. "Computers around here are on about the same level as bologna sandwiches," he said.

But he is confident that increased automation is coming. "The Chicago Police Department budget is about $400 million a year, and 95% of that is for salaries," he said. "With a detective's salary running about $15 an hour, we've got to be more efficient in using that time."

In computers, think IBM first... From that point on- think CMI

When you decide which IBM system best fits your needs, then decide on CMI. Few companies can match the level of professionalism CMI is noted for.

Our experts in Marketing, Financial Services, Operations and Sales have proven over the years that having CMI on your side is a decided edge.

S/E SUPPORT
S/E support and/or test time can be provided with a system supplied by CMI to ensure a smooth conversion.

IBM ACCEPTABILITY
All CMI supplied equipment is certified eligible for an IBM maintenance agreement.

BRANCH OFFICE SUPPORT
CMI's plan is to keep you as an IBM customer running on IBM Systems.

DELIVERY & PRICE
CMI promises...Fast delivery
Lower purchase price
Lower lease rates
More flexibility

In addition, we can structure a Purchase/Leaseback on your present system and save you money while offering upgrades, lease extensions and purchase options.

CMI Since 1969 CORPORATION
755 W. Big Beaver, 19th Floor, Troy, Michigan 48084
(313) 362-1000

Adapso Split in Vote Not to Sue Big Eight Firm

By Bill Laberis
CW Staff

NASHVILLE, Tenn. — How close did the Association of Data Processing Service Organizations (Adapso) come to filing suit against Arthur Andersen & Co. at Adapso's 58th Management Conference here last week?

It is difficult to gauge. On one hand, Adapso's Certified Public Accountant (CPA) Relations Committee, following an animated two-hour meeting at the conference, overwhelmingly voted to sue the Big Eight accounting firm on grounds of Andersen's alleged unfair competitive practices in selling computer services to audit clients.

On the other hand, at a closed session of Adapso's executive board the next morning, the board negated the committee's vote to sue, choosing instead a multipronged approach to resolving its long-standing beef with the Big Eight over the sale and marketing of computer services to audit clients. Part of this approach will include the aggressive pursuit of evidence in preparation of a possible lawsuit, something which many Adapso members said last week is inevitable.

But the meeting of the CPA Relations Committee pointed out some key impediments to litigation against Andersen or any other Big Eight firm, despite heated overtures from many Adapso members who, from appearances, are spoiling for a court fight.

Committee Reviews Efforts

The committee meeting began with an overview of Adapso's efforts to date in dealing with the accounting firms. These efforts have included dialogues with the firms, which the committee members felt were largely fruitless; intensified lobbying in Congress to put pressure on the Federal Trade Commission (FTC) and Securities and Exchange Commission (SEC); and public pronouncements of Adapso's gripe, which states that the Big Eight firms abuse their audit powers in landing over $500 million of computer service business per year. Andersen accounts for over half that amount, the committee claimed.

While some committee members said they preferred to work through the SEC and the FTC, claiming that the Big Eight firms have violated antitrust and securities laws and regulations, others felt the conservative mood in Washington, D.C., would thwart efforts to involve those commissions actively. Adapso claimed to have had some success with the commissions in the late 1970s, when the SEC promulgated broad rules that, Adapso said, were designed to limit the scope of the Big Eight's business operations regarding the sale of computer services to audit clients.

However, in mid-1981, the SEC, under the leadership of the former vice-chairman of a stock brokerage house, rescinded a key SEC ruling pertaining to the Big Eight and computer services.

Recognizing the failure of past efforts, committee members last week began clamoring for litigation. Jay Goldberg, president of Software Design Associates, Inc., said, "There is a lot of feeling among people in professional services that the only way this issue is going to be resolved is through litigation." Goldberg later cast the only dissenting vote on the litigation question, saying Adapso needed more time to gather evidence.

CW At Adapso

"There is no chance we are going to achieve what we're after through discussion with them," said another committee member.

But some sobering realities became apparent as the meeting progressed. For one thing, Milt Wessel, Adapso's general counsel, said any suit filed by Adapso would have to include the name of a member company as a co-plaintiff. Many, if not most, of Adapso's 575-member companies do business with the Big Eight firms directly. Others rely on the accountants for important referrals during the audits of major companies where the audits indicate a need for enhanced computer services. Thus, there were no volunteers for co-plaintiff.

No Volunteers

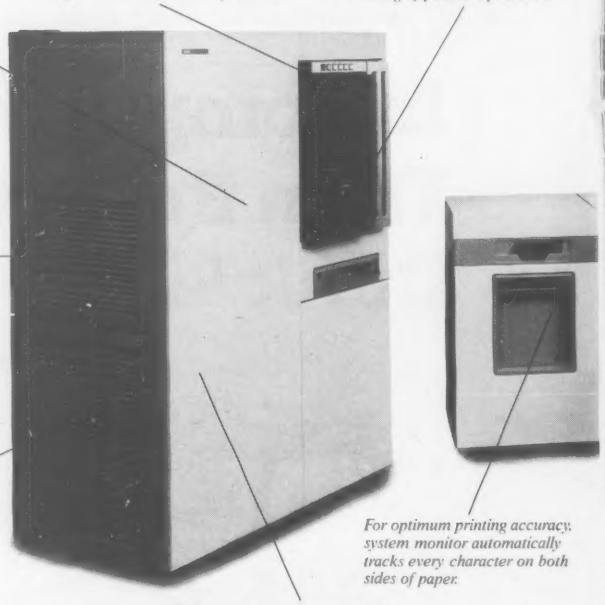
There were no volunteers, either, when Douglas Jerger, committee chairman, asked for company executives to be included on a list of press contacts regarding the Big Eight matter.

Wessel speculated that the cost of the suit could run "into hundreds of thousands of dollars." And given the evidence of the Big Eight's or Andersen's alleged illegal activities gathered to date, Wessel told the committee, "You could file a lawsuit . . . but it would be a weak one now."

In an internal document circulated recently among the Adapso membership, Wessel's office said, "It should be noted that while the theories underlying Adapso's antitrust claims are responsible and based generally upon the principles underlying traditional antitrust theory,

(Continued on Page 15)

We built in 14 good
to offer you an upti


Automatic check and recheck of all incoming data assures accurate printout.
System software contains built-in diagnostic program for early warning of potential problems.
During operational breaks, key systems are automatically exercised, electronically, to check system integrity.
Contains a powerful minicomputer with built-in intelligence to control system operation.
To provide precise form-to-data registration and allow immediate updates, electronic forms are designed and stored in the system itself.
For optimum printing accuracy, system monitor automatically tracks every character on both sides of paper.
Software's error-management design allows continued operation in event of recoverable failures.

If we wanted to, we could point out a lot more. But you get the idea.

Our Xerox 9700 electronic printing system is designed to operate in your data center. Every day. 365 days a year.

Just like our 8700 electronic printing system.

Which is why we can guarantee its uptime to you for an average of 684 out of the 720 hours in each month, on a quarterly basis.

Less the time needed for regularly-scheduled servicing, of course.

If we're wrong, we'll credit you for your downtime.* And we'll give you that guarantee in writing.

All we ask is that you help us take care of your system according to the provisions of the Xerox Uptime Guarantee Program.

To further assure that you get flexible, high-quality document production, we'll also train your people.

And we'll assign one of our special teams of Customer Engineers directly to your machine.

(They come with months of lab training, and a

XEROX® 9700 and 8700 are trademarks of XEROX CORPORATION.

*Subject to the provisions of the Xerox 9700/8700 Uptime Guarantee Program. Full details available upon request.

Growth, Environment More Important

Raises Seen Not the Best Motivational Factor

By Bill Laberis
CW Staff

NASHVILLE, Tenn. — As a DP manager, is the merit pay raise the most potent weapon in your employee motivation arsenal? Do you send staff members on business trips without first checking whether they like to travel? Do you manage some employees at remote sites, away from the department mainstream?

If your answer is yes to one or more of these questions, you may have a morale problem and therefore a crying need for motivational stimulation on your hands.

This was the message delivered by three speakers at a work session of the 58th Management Conference of the Association of Data Processing Service Organizations (Adapso) here last week .

In addressing the question of what motivates the DP employee, Jack Murray, senior vice-president of Computer Horizons Corp., paraphrased motivation guru Fred Hertzberg in telling his audience, "If you think you're motivating your people with money, you're mistaken."

Until this year, DPers had been accustomed to annual raises in the 10% to 20% range, much of which was spurred by rampant inflation, Murray said. Several consecutive years of such healthy raises produced a situation where money as a motivator "was like washing your hands; they just got dirty again the next day," he said.

CW At Adapso

Speaker George Florit, president of Berton Group, Inc., agreed with Murray's thesis, saying his experience has shown that cash awards rank "a distant third behind professional growth and a suitable social environment" as wellsprings of employee motivation.

This year, however, inflation has clearly abated and raises of 5% to 8% will be the norm, Murray said. For DP managers, the result may be a motivation crisis. Murray's motivation prescription, therefore, included a laundry list of nonmonetary items to stimulate the DPer in 1983.

First, managers must strive to imbue DPers with a sense of involvement and contribution to the organization, while being extra careful to recognize personal accomplishments. In Murray's words, "A well-placed bottle of wine at the right time can have more benefit than a merit pay increase." He also recommended that managers organize workers within group projects to relieve them of the mundane and repetitive tasks that often characterize the DPer's day.

Managers should also tailor the DPer's work schedule to his skill level and predilections, Murray continued. Thus, a programmer with a penchant for data base should not be unnecessarily cast into an applications role.

Berton Group's Florit stressed a thorough, year-long orientation to ensure that employees do not become submerged within a large organization. At the Berton Group, this orientation includes 30 days of on-site supervision, 30-day performance reviews at the end of the first, second and third months of employment, and jointly developed training plans spanning the first year of employment, with specific goals set forth.

Herb Lopato, district manager for American Bell, Inc., explained a variety of techniques he employs to motivate and stimulate about 160 Bell employees and 150 consultants under his direction.

High on Lopato's list is the provision of short-term work assignments "that provide immediate ego gratification." Lopato recommended breaking up long-term projects into increments no longer than four months' duration to "keep it short and measurable."

Adapso Divided On Suit Decision

(Continued from Page 14)

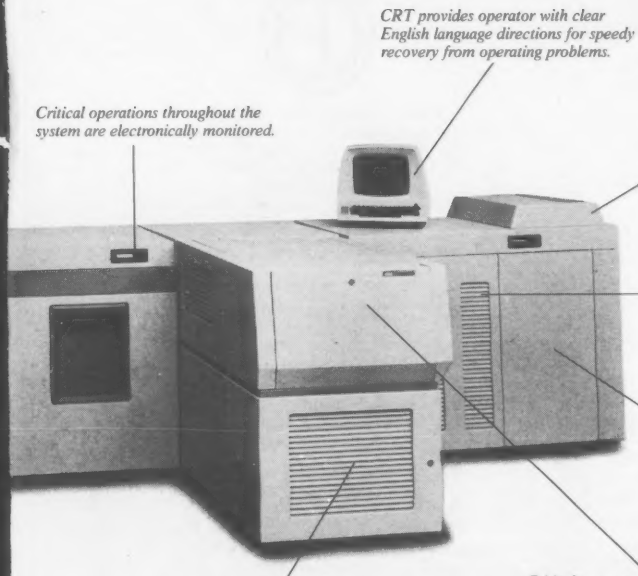
they do represent some development of that theory. As such, Adapso's claims may not be favorably received by a judiciary which has recently begun to take a more conservative approach."

Commenting on the executive board's vote rescinding the committee's decision to file suit, David Campbell, president of Computer Task Group, Inc. and both a board and committee member, said Adapso will step up lobbying efforts in Congress to bring pressure to bear on the SEC and FTC.

Asked about the possibility of litigation against a Big Eight firm in the future, Campbell said, "I think it is likely we will some day initiate litigation. The government and the [Big Eight] companies have left us no choice."

reasons
me guarantee.

XEROX


CRT provides operator with clear English language directions for speedy recovery from operating problems.
Critical operations throughout the system are electronically monitored.
For optimum operation, paper flow is timed and tracked to the nearest fraction of a second.
Use of consumables, such as paper, toner and developer, is tracked to ensure efficient operation and quality output.
Printing mechanism is a high-speed, state-of-the-art Xerox printer.
Critical systems are monitored, with recoverable errors and near-misses logged, to catch failures before they happen.
Laser print resolution at 300 x 300 dots per square inch assures high-quality images.

national communication and computerized parts-backup system that lets them make any needed corrections quickly and accurately.)

We'll even regularly update your software. So you'll always have the latest in system capabilities and reliability.

Unlike some Johnny-come-lately electronic printers, the Xerox 9700 doesn't come with just promises.

It comes with a written guarantee.

If you want more information, call toll-free, 1 (800) 556-1234, Ext. 95. In California, 1 (800) 441-2345, Ext. 95. Or write: Xerox Printing Systems Group, 880 Apollo Street, P1-60, El Segundo, California 90245.

That'll get you the rest of our story.

The Xerox 9700 Electronic Printing System.

Senate Hears Private-Sector Support of S. 999

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Legislation to create a White House office for international telecommunications and information policy received support from the private sector last week. However, the proposal continues to be viewed skeptically in influential government circles.

Spokesmen for several corporations, including Control Data Corp., AT&T, ITT, Communications Satellite Corp. and MCI Communications Corp., told the Senate Communications Subcommittee last week that the apppointment of a special representative for telecommunications and information, as envisioned in S. 999, would be an important first step in making these subjects a high priority within the government.

The Defense Department, however, told the Senate subcommittee that the authority of the new office and the executive branch task force the special representative would head might interfere with defense communications.

Donald C. Latham, deputy undersecretary of defense for communications, command, control and intelligence, said he is "concerned . . . that as presently written, the reorganization contemplated in S. 999 could result in unintended intrusion of the special representative or the task force into our myriad day-to-day international communications operations."

Any authority of the new office to "make, review or approve the many planning, programmatic and operational decisions affecting our telecommunications systems and operations" could seriously hamper those operations, according to Latham. He suggested that the State Department's recent reorganization of its international information and telecommunications activities may be sufficient for U.S. government handling of those matters.

Diana Lady Dugan has been named coordinator of international communications and information policy with the rank of ambassador at the State Department, a move Latham said makes enactment of the special representative provision of S. 999 unnecessary. The State Department also claimed that its new organizational structure adequately fills the role set out in the Senate bill.

Concerns similar to those of the Defense Department were expressed by Federal Communications Commission (FCC) Chairman Mark S. Fowler, who praised the concept of the special White House office, but said he is worried that its responsibilities may go beyond policy coordination, "reaching into the realm of policy making," which, he said, could interfere with FCC activities.

Fowler nonetheless endorsed creation of the new office "because it would be helpful to have a high-level, central voice for administration policy on international telecommunications." He asked the subcommittee, however, to spell out carefully the authority of the special representative and the proposed task force.

Private-sector witnesses at last week's hearings were more unequivocal in their support of the bill. One, CDC's Phillip C. Onstad, called the new office "absolutely essential" (see story below).

Foreign Rate Hike of 700% Warned

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Attempts by the U.S. to impose its procompetitive position on foreign nations could mean a whopping 700% increase in the communications bills of multinational firms.

That warning was issued last week by Philip Onstad, assistant to the general counsel of Control Data Corp., at a Senate hearing on S. 999, a bill that would alter the way the executive branch develops international telecommunications policy.

Onstad was referring to an August 1982 decision by the Federal Communications Commission that allows U.S. international communications carriers to offer on-line information, remote data processing and other "enhanced" services without filing a tariff or getting the commission's approval.

Foreign carriers oppose this move on two counts: First, they were not consulted beforehand; second, they fear it will encourage users to share circuits instead of leasing them on a full-period basis, thus reducing the foreign carriers' revenue.

U.S. multinational companies, Onstad said, believe the foreign carriers will retaliate by imposing usage-sensitive communications rates and by requiring use of their public data networks.

In an interview after the Senate hearing, he added that a recent survey of U.S. companies operating overseas disclosed that if they were forced to pay usage-sensitive rates instead of the present usage-insensitive monthly charges for circuits leased from European carriers, the average communications bill would increase 700%.

U.S. companies cannot defend themselves if foreign carriers raise rates or retaliate in other ways against U.S. deregulatory policies, according to Onstad.

"When a company comes to the U.S. government for help, it soon finds that responsibility and authority for international telecommunications and information matters are divided among many departments and agencies. The company finds itself being bounced from one agency or department to another without obtaining relief," Onstad told the subcommittee.

S. 999 would reduce this confusion by authorizing appointment of a "special representative for telecommunciations and information," who would be a member of the White House bureaucracy.

The special representative's major mission would be to coordinate telecommunications policymaking and thus reduce the "fractionated responsibility and authority inherent in the current structure," Onstad explained.

Mini Reels

100' ..... $2.79 ea.
150' 2.99
200' 3.19
250' 3.29

TAPES ARE: SEALED IN REUSABLE ZIP LOCK BAGS
SHIPPED WITH WHITE CORRUGATED MAILERS
6250 BPI - CERTIFIED ERROR FREE*
PLUS 15' LEADER FRONT - 25' BACK

WHITE TAPE SEALS ..... $1.25 ea.
GREY PLASTIC MAILERS ... .85

THE CPI USER'S GROUP
EVERYTHING IN PRINTING, SUPPLIES & FURNITURE
FOR THE OFFICE AND COMPUTER ROOM
77 PARK STREET RIDGEFIELD PARK, N.J. 07660
(201) 641-8000
CALL FOR FREE SAMPLE MINI REEL

*Signal Quality
All tapes individually certified to be "write-skip error-free" at 50% clipping level at 800 BPI, 35% clipping level at 1600 BPI (3200 FCI), and compatible for use at 6250 BPI. Mini Reels meet or exceed all WT-0051C specifications, and surpass all industry performance demands.

Magnetic Characteristics
Signal Level* ..... ± 10% @ 556 or 800 BPI
+25% to - 10% @ 3200 FCI
Compatible @ 6250 BPI
Remanence (or) ..... 1.1 to 1.6
Intrinsic Coercivity (Hci) ..... 280 ± 15

DEC USERS

OUR WP/DP SOFTWARE
LEX~11™
NOW AVAILABLE FOR P/OS
ON THE PROFESSIONAL 350s

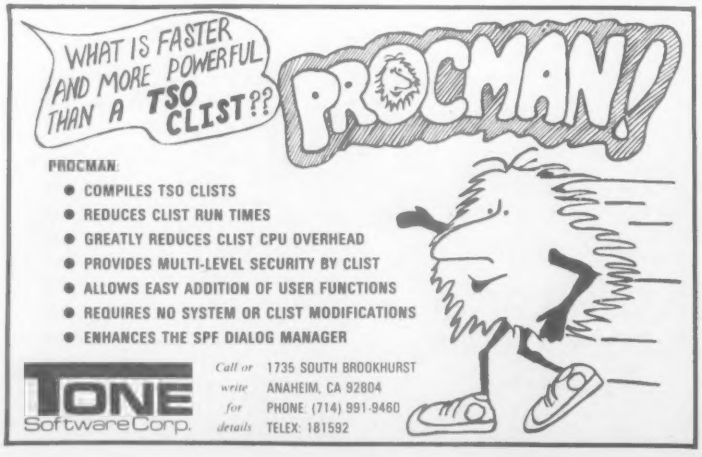
☐ Software that is really special
☐ Fast, flexible, easy to use
☐ Fully featured
☐ Phone us for a modem demonstration
☐ Self paced on line tutorials
☐ New low pricing

DEALER ENQUIRIES WELCOME

EEC SYSTEMS, INC.
DEPT. COW
MILLBROOK PARK
327/E BOSTON POST RD.
SUDBURY, MA 01776

PUT OUR SOFTWARE TO THE TEST: CALL 617-443-5106

LEX-11 is a trademark of ACE Microsystems.
P/OS is a trademark of Digital Equipment Corp.



PROCMAN:
- COMPILES TSO CLISTS
- REDUCES CLIST RUN TIMES
- GREATLY REDUCES CLIST CPU OVERHEAD
- PROVIDES MULTI-LEVEL SECURITY BY CLIST
- ALLOWS EASY ADDITION OF USER FUNCTIONS
- REQUIRES NO SYSTEM OR CLIST MODIFICATIONS
- ENHANCES THE SPF DIALOG MANAGER

TONE Software Corp.
Call or write for details
1735 SOUTH BROOKHURST
ANAHEIM, CA 92804
PHONE: (714) 991-9460
TELEX: 181592

AT&T to Greene: Access Fee Due to Competition

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Competition, not the breakup of the Bell system, is the main reason local telephone rates will increase after divestiture, AT&T said here early this month. The comment was addressed to federal District Court Judge Harold Greene, who is presiding over implementation of the antitrust settlement AT&T and the Justice Department negotiated last year.

The phone company, which wants Greene to accept the reorganization scheme it submitted to him last December, apparently became concerned when the judge indicated some changes might be necessary because of the Federal Communications Commission's (FCC) access-charge decision. Under that decision, beginning next year, all users will have to pay their local telephone companies an additional fee to reimburse them for providing access to the long-distance telephone network. Much of this access cost will be levied in the form of a flat charge. Greene recently said this part of the FCC's decision "runs directly counter" to one of the principal purposes of the antitrust case settlement — that "the fostering of competition in the telecommunications field need not and should not . . . cause increases in local telephone rates."

In its recent comment, AT&T argued that the FCC had to shift long-distance charges from usage-sensitive fees to flat rates because of the bypass threat.

According to the phone company, it costs a local telephone company an average of $7/line/mo to provide access to the long-distance telephone network. Presently, this bill is levied directly on the interstate carriers who pass it on to their customers in the form of usage-sensitive charges. As a result, some users pay much more than others. "One percent of the Bell operating companies' customers account for 42% of the revenue necessary to recover the $7/line/mo," AT&T told Judge Greene, adding that "the average access payment of these high-volume customers is about $160/line — 23 times the price they would be charged on a [flat-rate] basis."

No customer will pay this much to access the long-distance network if less expensive competing facilities are available, the phone company pointed out, adding that "the technology is here today" to support bypass throughout the nation.

Nata Criticizes Bell's Service Fee

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The North American Telecommunications Association (Nata) presented the Federal Communications Commission early this month with "documentary proof of the Bell system's use of the [Maintenance of Service Charge] to discriminate against competitive telecommunications equipment vendors."

Nata represents many manufacturers of what is usually referred to as interconnect equipment. For at least three years, non-Bell terminal makers have been trying to eliminate the service charge AT&T imposes on users of non-Bell terminals.

The latest chapter in this argument involves John Roselli, a New York antique dealer, who was billed $195 last summer by his interconnect supplier for diagnosing a service failure that was due to circuit facilities supplied by New York Telephone Co. When Roselli asked New York Telephone to pay this bill, his request was refused. "In order to avoid similar problems in the future," a phone company service representative wrote, "you should consider changing to Bell system equipment. There are no charges for repair problems on our equipment."

"The letter's message is clear and all too familiar," Nata President Edwin B. Spievack said. "'If you buy from us, you get free maintenance; if you buy from a competitor, you don't.' Although New York Telephone's claim of free service is incorrect, such use of the [Maintenance of Service Charge] as a tool to thwart competition occurs all too frequently. If there was ever any question about the . . . need to eliminate the [Maintenance of Service Charge] . . . that doubt is totally dispelled by New York Telephone Company's letter," he said.

In earlier rounds of this argument, Nata has argued that the Maintenance of Service Charge is anticompetitive because it is imposed only on users of interconnect terminal equipment when AT&T's repair technician finds that the terminal, rather than the line, is responsible for a service breakdown. If the trouble is due to a Bell-supplied terminal, no maintenance charge is levied.

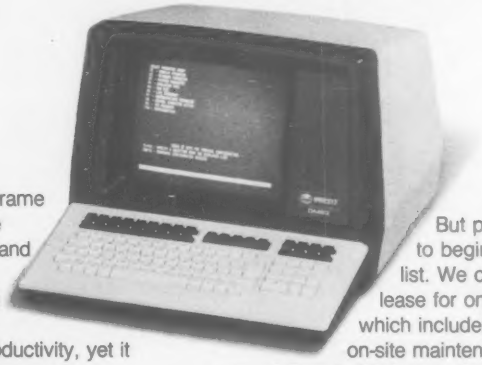
However, as AT&T has pointed out, maintenance is included in the user's monthly terminal equipment charge, so the service call is not free.

Nata insists this terminal charge has never been broken down to show how much the user is actually paying for maintenance. Therefore, it is difficult, if not impossible, for him to determine whether non-Bell equipment would be more cost-effective.

BEEHIVE or BURROUGHS?

Two-year lease with maintenance $75./month Through June 30, 1983.

The Burroughs alternative from BEEHIVE



Your Burroughs mainframe can't tell the difference between our terminal and theirs...but you can. Because ours is much easier to operate and increases operator productivity, yet it costs less to buy or lease.

Our DM83 terminal combines extended memory with extra function keys to minimize terminal/CPU interaction. With up to 36K of optional RAM, the 16 function keys can be used for fast recall of locally stored data. For example, you can store multiple forms in the terminal for faster operator access. Productivity gains alone can pay for this terminal many times over.

But price is a bargain to begin with...just $1995 list. We offer a two-year lease for only $85 a month, which includes nationwide on-site maintenance. And we can deliver in 60 days or less.

Additional features include a Burroughs-compatible keyboard, extensive self-test diagnostics, and support for all major Burroughs polling protocols.

Since your Burroughs computer can't tell the difference, why not choose the terminal that gives you the big advantage in price, performance, availability and service? Get all the details by calling Beehive toll-free today.

CALL TOLL FREE 1/800/453-9454

BEEHIVE

Beehive International • 4910 Amelia Earhart Drive • P.O. Box 25668 • Salt Lake City, Utah 84125.

Sales Offices:

CALIFORNIA Costa Mesa 714/540-8404 • Sunnyvale 408/738-1560 • FLORIDA Altamonte Springs 305/788-9000 • ILLINOIS Arlington Heights 312/593-1565 • MASSACHUSETTS Woburn 617/933-0202 • MISSOURI Independence 816/356-4402 • NEW JERSEY Colonia 201/381-9883 • NORTH CAROLINA Greensboro 919/854-2694 • TEXAS Dallas 214/239-3330 • UTAH Salt Lake City 801/355-8000 • WASHINGTON, DC (VA) Falls Church 703/573-1261

Computer Trade Marts to House Conferences,

By Paul Gillin
CW Staff

The day is still far in the future when a company will fill all its DP needs in a single walk-in environment. But a host of commercial developers are now betting that the trend is in that direction.

Plans for computer trade marts — or permanent computer exhibition and conference centers — have been sprouting up with increasing frequency in recent months. Proclaimed as a new concept in computer marketing, they will offer major conference facilities and educational programs, permanent exhibit space and advanced demonstration capabilities under one roof, according to developers.

At least five computer trade marts geared toward the volume buyer have been announced — in Boston, Dallas, New York, San Francisco and Toronto — and others are being considered in Miami, Atlanta, Chicago, Los Angeles and Philadelphia. They range in size from the 112,000-sq-ft New York Computer Center to the 1.4 million-sq-ft Boscom market center in Boston.

The centers will be targeted toward buyers of systems and software for large and medium-size installations. Permanent exhibits will change regularly to accommodate the myriad of trade groups that developers hope will hold conferences at the trade marts. In addition, most facilities will be open daily for demonstrations and educational programs. Some vendors may even move offices into their exhibit space.

Buyers will save travel expenses while being able to see several vendor demonstrations in a single day, according to developers. "Buyers are confused and they need an environment in which they can compress that very costly buying cycle," said Bill Winsor, general manager of Infomart.

But while announcements have been accompanied by a great deal of fanfare, observers and even developers admit that the concept is too new and untested to be evaluated effectively. Marketing studies indicate that the showrooms have promise — a Strayton Corp. study commissioned by Boscom found that 63% of top computer executives surveyed said they would visit a computer market center.

Clearly, there is interest from users. "I'm very impressed. It will be effective for someone in my position

(Continued on Page 19)

Centers to Target Volume Buyers, Specific Needs

Although its name may evoke images of a high-tech shopping mall, the computer trade mart is more like an expanded demonstration center, according to developers and vendors interviewed by *Computerworld*.

Almost across the board, the centers will be targeted at volume buyers from large and medium-size businesses, developers said. In most cases, outright sales will be prohibited on the floor.

Permanent exhibits will probably display a range of products. Many will have attached demonstration centers. The IBM exhibit at Boscom, the Boston market center, "will be a comprehensive look at the IBM product line," from microcomputers to mainframes, an IBM spokesman said. The company's 20,000-sq-ft display is intended "to get in as much product space as possible," he said.

Most centers will screen visitors by charging a liberal admission fee or requiring visitors to register and identify the kinds of products they want to see. "We want to prevent the trade show environment where you've got thousands of people not really knowing what they want, but just walking around," said Barry Segall, vice-president of the New York Computer Center.

The price to get in can be steep; Boston's Boscom will charge $35 to someone walking in off the street, a measure aimed "at keeping the tire-kickers out," according to Jack Cochran, Boscom's vice-president of marketing and programs.

Instead, the trade marts will rely heavily upon drawing attendees with specialized needs. Toronto's Systems Mart plans to sponsor a continuous program of Market Weeks, addressing such topics as word processing, purchasing, transportation and manufacturing. Temporary exhibit space will be available to vendors targeting those special groups, and permanent exhibits will likely be geared to the changing characteristics of the audience.

The marts are also sponsoring trade shows and conferences and positioning themselves close to major conference centers. Dallas' Infomart, for example, claims to have 26 shows scheduled for the first nine months of operation. Boscom's plans include 55,000 square feet of meeting space encompassing two 250-seat auditoriums and 45 meeting rooms.

When not catering to special events, all trade marts will be devoted to demonstrations and sales pitching. "We see it as a market support center. It's a method of demonstration and support," said Bill Winsor, general manager of Infomart.

Byte watchers.

What you need for your computer room is new from Teledyne Inet.

New-generation UPS: highest efficiency, half the space.
Our new generation 400 kVA/360 kW Uninterruptible Power System (UPS) gives you 360 kW of constant, reliable 60 Hz power, yet takes up only half the floor space of competing units. But more than that, it also features the highest efficiency at operating loads. So, it costs less to install, less to operate.

New interactive display monitor: status appeal.
To precisely monitor the performance of your entire UPS system, our new interactive display system (IDS) is the most comprehensive microcomputer-based status data processor on the market. An interactive terminal displays critical information such as on-line diagrams, critical events, instrumentation operating instructions, and parts inventory, in easy-to-read color graphics, with a user-friendly software system that operates through a main menu. Optional features include a printer (with color option), modem capability to connect to regional and central service offices, customer displays and reports for special customer requirements. The Teledyne Inet IDS can be installed remotely, and will monitor up to 10 UPS systems, so it can be tailored to your particular needs.

See us at NCC.
Both our new 400 kVA/360 kW UPS and our new IDS status display terminal will be on display during NCC. And while you're there, you'll be able to learn about our full line of 75 to 555 kVA 60 Hz, and 40 to 225 kVA 400 Hz UPS systems. Protect your investment in computer hardware and software. Talk to the precise power people at Teledyne Inet.

SEE US AT BOOTH S-5025

TELEDYNE INET ...the precise power people

2750 West Lomita Boulevard / Torrance, California 90509 / (213) 325-5040
Sales Offices: New York, New York / Dallas, Texas / Washington, D.C. / Atlanta, Georgia

Exhibits, Programs

(Continued from Page 18)

who spends a lot of time at trade shows," said John Rutter, director of Systems Management at Polaroid Corp. in Waltham, Mass. "It could be a convenient demonstration tool for corporate users."

However, few DP managers have been briefed on the planned facilities since the announcement blitz began, and observers question whether the market ultimately can support more than a half dozen of the market centers.

"There's a lot of smoke being puffed out there and there is a long way to go before these things are translated into reality," according to Peter Young of the Interface Group, a Framingham, Mass.-based firm that manages many trade shows.

"A lot of developers don't have any concept of what it's all about," according to Brad Griffith, executive vice-president of Leggat, McCall and Werner, a Boston-based developer that scrapped plans for a trade mart in Dallas last year.

"We were in it for a year and realized that it was a lot more than real estate — it's a business. Very few developers we have talked to understand the risks involved," Griffith contended.

"Every developer with an empty building is thinking about opening one," Jack Cochran, vice-president of marketing and programs at Boscom, said.

Smaller developers are relying upon a regional emphasis to sell the concept. "We're not competing with Boscom," said Barry Segall, vice-president of marketing for the New York Computer Center, a $10 million trade mart scheduled to open in December.

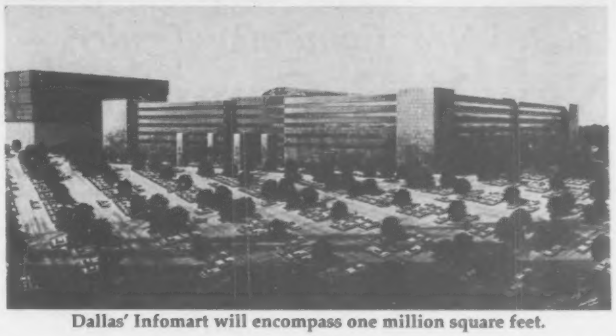
A Number of Uses

"In any regional city you get specialized trade shows with space renting at $14/sq ft for four days. Here the vendors can get space for $30/sq ft that can be used as office space or for any number of other uses." Segall said the New York Computer Center will be the first of a string of regional trade marts in New York, Atlanta, Chicago and Los Angeles.

Toronto's Systems Mart, which was announced last week, reported no commitments from vendors yet, but expects to house about 60 vendors doing business in Canada when it opens in the summer of 1984.

"We're not concerned about competing," according to Helen Briggs, project director for the 256,000-sq ft project. Briggs explained that "Toronto is Canada's business center and Canada is that much different from the U.S. market."

A San Francisco developer has targeted a September 1984 opening for California Datamart, reportedly a 142,000 sq-ft facility.



Dallas' Infomart will encompass one million square feet.

Computer Marts In Boston, Dallas Gain Bookings

The key to computer mart success will be the ability of each project to attract major trade shows and vendor commitments. Boscom and Infomart have proved to be successful at that task.

Boscom claims to have letters of intent from more than 120 vendors and nine trade associations. Dallas' 1.1 million-sq-ft Infomart reports that 85 vendors are committed to permanent exhibit space, while 26 trade shows are booked for the first nine months after its scheduled opening in the spring of 1984.

But some observers believe a shakedown is bound to occur as major vendors pick and choose the trade marts that generate the most business. IBM, for example, has leased 20,000 square feet at Boscom, but has taken a pass on Infomart. And other major vendors, including Data General Corp., Digital Equipment Corp. and Hewlett-Packard Co., are uncommitted to either major project.

"The potential is directly related to the support [the marts] get from the industry," according to John Forbes, director of corporate communications at M/A-COM, Inc., which will lease space at Boscom. "I don't question the concept that much, but if you dilute it and have 10 of them around, it's going to confuse the matter."

IB Graph for DEC users. If it wasn't so interactive, it wouldn't be used.

At Data Processing Design, we do one thing very well. Better than anyone else, in fact. We provide quality software for Digital Equipment Corporation computer systems. We call it Used Software, and it's the most thoroughly tested, well thought-out, and debugged family of software in the DEC-compatible industry.

Our latest product is IB Graph,™ the complete system for business graphics on DEC PDP-11™ and VAX™ systems. It's a multi-user, interactive business graphics system that lets you quickly and easily prepare a wide variety of charts— — including pie charts, bar charts, and line charts.

IB Graph lets you enter data interactively or convert data from other formats, such as data processing files (including RMS files), or list processing documents (created through WORD-11™ or DECWORD™). Now you can store the definition of charts and recall and modify these definitions to create exactly the chart you need, when you need it.

And IB Graph is easy to use. Anyone can produce charts in a few minutes that used to take days to develop. It's menu-oriented and includes hundreds of help screens. Furnishing you with the kind of instant direction you'll need while learning IB Graph's operations. Which won't take long, either.

So if you'd like to know more about IB Graph, call or write to us at DPD. We'll be happy to provide you with all the information you need on our newest Used Software product.

And how using it to make your company more productive is as easy as, well, pie.

IB Graph

Data Processing Design, Inc.

CORPORATE OFFICE • 181 W. Orangethorpe, Suite F • Placentia, CA 92670 • 714-993-4160 Telex 182-278

PDP-11, VAX, and DECWORD are registered trademarks of Digital Equipment Corporation. IB Graph and WORD-11 are registered trademarks of Data Processing Design, Inc.

Located Near Convention Center

New York Computer Center Set to Open in '84

By Bob Johnson
CW New York Bureau

NEW YORK — The New York Computer Center (NYCC) will offer computer information to everyone from large system DPers to home computer hobbyists, according to its developer, the Atlantic Coast Development Corp. of Hallendale, Fla.

Scheduled to open by early 1984, the $10 million project is one of six centers planned for major cities around the country. It will be located one block away from the New York Convention Center, a $375 million effort slated to open in the summer of 1984.

Between 80 and 100 permanent exhibitors are expected to establish showrooms on the computer center's upper floors, with the exhibition hall below available for other events.

Six Floors of Space

According to Barry Segall, vice-president of marketing for the developing company, the computer center will include six floors of exhibition space, conference rooms, technology displays, a visitor information center and a communications network. No retail sales will be allowed at the NYCC, he said, but orders will be permitted.

Although the New York entry into the computermart arena is similar to other recently announced centers such as Boscom in Boston and Infomart in Dallas, it will also include an aggressive vertical marketing program as support.

"Every time a major segment of a vertical market holds a conference or show at the New York Convention Center, we will have a special computer show at our center to coincide with it," Segall said.

A half-million dollar publicity and advertising campaign will target professionals two months before their scheduled attendance at the convention center, Segall said.

In his opinion, vendors have been more concerned with product development than with marketing, their usual way of getting interested professionals together being through "ineffective, sporadic seminars."

He maintained that the result was often many regional seminars trying to reach the same interest group at different times.

A vendor leasing space at the computer center (about $30/sq ft) will be able to reach a major portion of a professional group and gear its exhibits directly to that group, according to Segall.

In addition, special displays and shows can be presented by tenants in the center's exhibition hall.

NYCC will also have an automated lobby called the "Data Core," where graphic printouts will be available listing what products are offered by tenant/vendors and where they are located in the building. A "Future Works" area, divided into two sections displaying functional operating equipment — "Future Office" and "Future Home" — will also be part of the center.

"Future Office" will be a fully staffed, glass-enclosed exhibit that will also offer a time-shared service for tenants.

Video and teleconferencing by microwave and satellite communications will be available to tenants, as well as an in-house network connecting the showroom areas, the "Future Works," exhibition hall and conference/seminar areas, Segall said.

'That's My Computer You're Shaving With.'

NOW,
IMS AND IDMS USERS
HAVE A MIGRATION PATH
FORWARD.

TIS

First generation, pointer-based DBMS products like IMS and IDMS face major shortcomings in meeting modern needs: limited integration, limited facility, and limited data insulation from both the DBMS and the data structures. Most important, they cannot meet the diverse application requirements of your organization in the future.

Clearly, new technology is needed to meet your modern requirements. That technology is TIS, from Cincom Systems, to allow you to migrate forward from older technology.

Cincom®

Army to Test Microchip Version of 'Dog Tag'

By Patricia Keefe
CW Staff

FT. HARRISON, Ind. — Bringing the military "dog tag" into the technological age may well be the key to the paperless war, according to the U.S. Army. The Army plans to conduct tests this year to determine the feasibility and utility of microchip versions of the tags.

If testing is successful, Army troops could be issued plastic tags or cards with an embedded microchip carrying a soldier's complete training and medical histories as well as his name, rank and serial number by late 1985, according to Chris Occhialini, the civilian chief of the High Technology Personnel System Project here.

The main reason for the microprocessor-embedded cards — which are officially called Soldier Data Cards and resemble standard bank or credit cards — is to speed access to each soldier's personal records.

For example, data from the tags could be fed into portable computer terminals in the field and relayed via a coded FM channel to headquarters, providing military command staff with an immediate picture of troop strength and location during battle.

This form of paperless recordkeeping could slash by as much as 50% the number of personnel clerks required in the U.S. Army, several Army officials said.

Testing plans for the Soldier Data Card, which has a 64K-bit electrically erasable programmable read-only memory, calls for both peacetime and simulated wartime applications. The Army is now considering an off-the-shelf system from Data Key and equipment only, Occhialini said.

Peacetime applications of the card will be tested this summer here at Ft. Harrison. The primary goal is a reduction of personnel support staff, reliance on paper and the amount of time it takes to process information.

This fall, the cards will be tested during military exercises by 3,000 9th Infantry Division soldiers at Ft. Lewis in Yakima, Wash. Soldiers in the 3rd Brigade will wear the small brown plastic tags, while fellow "dogfaces" in the 1st Brigade will wear the conventional metal dog tags.

'Too Much Paper'

The army is considering the Soldier Data Cards because "there is too much paper and too little time in which to handle it," Occhialini said. He cited an estimate that it would take 400 five-ton trucks just to move Army records out of Europe.

In addition, paper requires an "inordinate amount" of space to store and has the added disadvantage of being inflammable. A fire 10 years ago in St. Louis at the Reserve Component Personnel Administration Center wiped out an entire floor of records for which there were no copies, Occhialini recalled.

The Army is currently the only U.S. military group investigating use of the cards, but it is keeping other branches apprised of the project's progress.

Ansi Unveils Dictionary Of Terms

WASHINGTON, D.C. — The American National Standards Institute's (Ansi) X3 Information Processing Systems Committee has developed a dictionary of technical terms and abbreviations.

The publication covers computing, data communications, data processing, word processing and related fields. It is called "The American National Dictionary for Information Processing Systems" and was developed using Ansi procedures.

The Computer and Business Equipment Manufacturers Association (Cbema), which acts as secretariat to the X3 Information Processing Systems Committee, is handling distribution of the dictionary.

It costs $27 and can be obtained by writing to X3 Secretariat/Cbema, Suite 500, 311 First St. N.W., Washington, D.C. 20001.

TIS is much more than a DBMS. It's a complete integrated information system with an entirely new architecture designed for your wide diversity of needs and readily usable by your end-users.

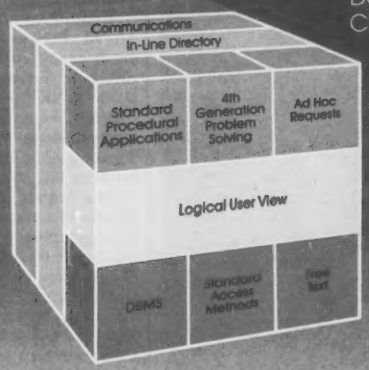
TIS: Modern technology for modern needs.

Designed for diverse, high volume, complex data base environments. TIS provides:

- **Full in-line integration**, so that one system can be used to meet the needs of all users with unprecedented security and control.
- **A relational view of data** which gives programmers and end-users complete data structure independence.
- **A powerful 4th generation procedural language** to serve requirements of both programmers and end-users.
- **A new Data Manipulation Language** so powerful only four commands are needed to handle even the most complex logical data base processing: GET, INSERT, UPDATE, DELETE.
- **An intelligent query language** to provide instant information to end-users for virtually all ad hoc needs.
- **A new DBMS component** that provides unique data structuring capabilities with high performance.

TIS: Your migration path forward from older technologies.

As users outgrow older DBMS technology, TIS offers a smooth and powerful migration path forward. For more on how you can partner with Cincom to capture the power and excitement of TIS, contact our Marketing Services Department, 2300 Montana Avenue, Cincinnati, OH 45211.



800-543-3010
(In Ohio: 513-661-6000.)
(In Canada: 416-279-4220.)

TIS, the next generation of integrated data base technology.

Systems
Your strategic software partner.

With Improved Distributed Processing

Yankee Group Predicts Enhanced System/38

By Ed Scannell
CW Staff

BOSTON — IBM will bring out a high-end System/38 sometime during the third quarter that could have a performance rating as high as .8 million instructions per second (Mips).

This forecast, along with predictions about IBM's future plans to enhance the distributed processing capabilities of its System/38s and its future 3270 strategy, was made by The Yankee Group, a marketing research firm here, in a three-part report entitled "Impact: IBM."

The report speculated that over the next two years, IBM will gradually improve the distributed processing capabilities of its System/38s by equipping them with enhanced Systems Network Architecture communications capabilities, a 3880-like disk controller/paging device, higher level languages, more efficient office automation software, improved terminal attachment, the ability to duplex systems and expanded business applications.

Significant price reductions on the System/38 series are also expected to be made, according to the report.

Of all these enhancements, the Model 9 with its superior processing speed will be the most significant, according to Yankee Group marketing analyst Frank Gens. "The higher end System/38s have a Mips rating of only .6 or .7; I expect the Model 9 to be at least .7 or .8," the marketing analyst maintained.

Gens said this added processing speed will be a necessity if the system is to handle adequately its added distributed processing responsibilities.

Terminal Strategy

The report contended that IBM's terminal strategy, particularly with the recently released 3178, will be to "flood the 3270 market" with generous price reductions and discounts that theoretically should increase the number of users.

With more users, the report concluded, there will also be an increased demand for disks, software and computing power that can only mean more advertising revenue for the Armonk giant.

Besides bringing in more revenue for the company, this "flooding" of the 3270 market places added pressure on competing minicomputer makers that are trying to position their systems downward into IBM environments, the report maintained.

The report also predicted that the hard disk-based XT will become the company's standard business microcomputer, relegating the floppy-based Personal Computer to home applications.

The Personal Computer will "probably be discontinued within the next 12 months," according to the report.

In addition, the much-rumored Peanut, which the study predicted will be available later this year, will most likely be an "intelligent keyboard" — for example, a stripped-down version of the Personal Computer that can be modularly upgraded.

The Peanut will essentially take the marketing niche now occupied by the Personal Computer, according to the report.

Finally, The Yankee Group said it expects IBM's newly formed Personal Computer Support System to be "significantly expanded in the near future," providing users with an electronic mail network through the company's Information Network.

The research firm contended that this facility will provide small business users with added processing power, sophisticated applications and various networking capabilities.

The three-part report costs $1,250, a spokesman for The Yankee Group said from 89 Broad St., 14th Floor, Boston, Mass. 02110.

Attach your IBM Personal Computer
to 3274/3276 Cluster Controller
IBM PC accesses host data base through existing 3270 coax network.
The Forte Series 3178, Model PC 78, consists of a printed circuit board that is inserted into an expansion slot of the IBM Personal Computer and an MS/DOS compatible software package. Your PC connects to your IBM 3274/3276 Cluster Controller (either BSC or SNA/SDLC linked) via existing coaxial cable. And that's all it takes to put your IBM PC directly on line with your mainframe computer (45XX Series through 30XX).
Your PC appears as an IBM 3278-2 CRT Terminal to your mainframe, so now the number-crunching world is yours locally. You can accomplish pseudo batch mode processing — even actual distributed processing. You don't have to bother with extra phone lines, modems, or other peripherals. With the Forte PC 78™ product, your IBM PC, your IBM cluster controller, and your IBM mainframe, you've got it all.
Forte Model PC 78 comes with features not found elsewhere.
Besides the coaxial line drivers and receivers, a separate communications processor, communications buffer, and control circuitry for PC bus interfacing on board the Forte PC 78™, it's got bells and whistles you'll really appreciate. For example, the entire functionality is resident on floppy disk — no PROM changes are necessary for program enhancement.
An individual serial RS-232C interface is included for local printer attachment, modem attachment, and other peripheral attachments.
Power-On diagnostics and menu-driven local and remote diagnostics are standard.
The Forte PC 78™ will not be a weak link in the parity data-checking chain. Data is received with parity, buffered (queued) with parity on the PC 78 circuit board, and then transferred to your application program with the highest integrity. This feature is especially important when transferring numerical and statistical files of data.
The Forte PC 78™ IBM PC-to-IBM mainframe is here. Now.
Our people at Forte have designed, built and marketed some of the most advanced computer interface devices for the past six years. Now, we're devoting all our efforts to personal computers (from IBM and many other manufacturers). You'll be seeing lots of new personal computer products in the months ahead. So call us today.
Making your personal computer mean business. That's our Forte.
(800) 233-3278
In California (408) 980-1750
FORTE™
1500 Norman Ave.
Santa Clara,
California 95050
FORTE DATA SYSTEMS, INC.
Forte and Forte PC 78 are trademarks of Forte Data Systems, Inc.
IBM and IBM Personal Computer are trademarks of IBM Corporation.
© Forte Data Systems, Inc. 1983

Safeguards for Cryptographic Keys

NBS Scientists Get Patent on Security System

WASHINGTON, D.C. — Two computer scientists at the U.S. Commerce Department's National Bureau of Standards (NBS) are receiving a patent for a computer security system said to provide special safeguards for cryptographic keys used to scramble or unscramble computer data.

One way to protect the secrecy of data is to encipher or scramble the message so it can be read only by those who have the key to decipher it or convert it to its original form. The integrity of the data can be assured if the sender can add to the data a code that can detect a cryptographic error and be verified by the intended receiver who has the correct key, a department spokesman said.

Sealing the Key

The Key Notarization System (KNS), developed by Miles E. Smid and Dennis K. Branstad of NBS' Institute for Computer Sciences and Technology (ICST), is said to protect data further by notarizing or sealing the key with the names of the transmitter and the intended receiver.

The notarization system uses the Data Encryption Standard, a cryptographic algorithm published by ICST as Federal Information Processing Standard 46.

Under KNS, the same key reportedly must be used to scramble and unscramble the information or to compute and verify the cryptographic integrity code.

Thus, only authorized transmitters can encipher the message, and only the intended receiver can decipher it.

No Fake Messages

In addition, neither party can fake a message or deny the authenticity of a message when the full capability of the KNS is used, a release said.

The KNS also makes it possible — by use of an agreed upon digital signature — for the receiver to prove to a third party that the message was sent by the transmitter, according to the release.

A U.S. patent number for "Cryptographic Key Notarization Methods and Apparatuses" will be issued soon, a spokesman said.

Nonexclusive licenses for manufacturing and using KNS are available from the Office of Government Inventions and Patents of the National Technical Information Service (NTIS).

The licenses cost $2,000 for the execution fee and 3% of net sales, according to an NTIS spokesman.

More information about licensing is available from George Kudravitz, NTIS, 5285 Port Royal Road, Springfield, Va. 22161.

A list of ICST's computer security publications is also available from ICST, located at A209 Administration Building, NBS, Washington, D.C. 20234.

Software Show Set For Paris

PARIS — The First International Software Packages Exhibition will be held here from May 30 to June 1.

The show is being cosponsored by the Centre d'Experimentation des Progiciels (CXP) and Sicob, a major organizer of data processing exhibitions in Europe. It is said to be the first trade show in Europe to be completely dedicated to software packages.

The exhibition will take place in the Palais des Congres and will host 167 American and European exhibitors.

Further information about the conference can be obtained by contacting U3S Corp., Suite 300, 1801 Ave. of the Stars, Los Angeles, Calif. 90067.

Sicob is located at 4 et 6, Place de Valois, 75001 Paris, France. CXP is headquartered at 5 Rue de Monceau, 75008 Paris, France.

A TESTIMONIAL FOR THE BURROUGHS B20 FROM SOMEONE WHO SPENT 17 YEARS AT IBM.

Dr. W. LEE SHEVEL
Senior Vice President, Corporate Operations, Burroughs Corporation

Some people think that because IBM is bigger than Burroughs, they're better than Burroughs. After working for many years at IBM, I can tell you that bigger doesn't necessarily mean better.

Take small business computers: the Burroughs B20 and IBM's Datamaster.

The B20 Series can offer up to five times more memory capacity, can store twice as much data, can have more workstations, offer more kinds of printers, and has a 25% bigger screen (to display more data at once).

With its powerful 16-bit processor and up to 640K bytes of RAM in each workstation, the Burroughs B20 gives each user his own computer, but with the power, memory and data base that was once associated only with mainframes.

More importantly, the B20 can be networked with other B20's (while sharing the same data base, printer, or mainframe communications), so everyone is always working with the latest, up-to-date information.

And because the B20 supports all four industry-standard languages (COBOL, FORTRAN, Pascal and BASIC), users can select the language best suited to their individual needs. With IBM's Datamaster you have one choice—BASIC.

In operating systems, the B20 will soon give you a choice of CP/M® or MS-DOS.™ Or you can choose BTOS, our own operating system, which has more features.

To operate the B20, all you do is open the carton, plug it in,* choose one of our many business software programs (payroll, accounts receivable, inventory control, etc.), and you're in business. (Our step-by-step training manuals are so easy to use, you can be doing sales projections, accounting tasks, or scheduling in a matter of hours.)

If there are any questions, just call the Burroughs hot line. Trained Burroughs computer specialists will help with any problem that arises. (90% of all questions are answered in the first call.) We also have service depots in 19 cities throughout the U.S., or you can choose on-site servicing.

So, when it comes to choosing between IBM and Burroughs, take it from someone who knows both.

The questions isn't who's bigger. It's who's better.

Burroughs

THE QUESTION ISN'T WHO'S BIGGER.
IT'S WHO'S BETTER.

*B22 mass storage unit requires installation by a qualified Burroughs service representative.
CP/M is a registered trademark of Digital Research, Inc.
MS-DOS is a trademark of Microsoft Corporation.
For more information call 1-800-621-2020 or mail coupon below.

I'm interested in the Burroughs B20 small business computer.
Please send me more information.

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone_____

Send to: Burroughs Corporation
Dept. B20, Box 10934, Chicago, IL 60610
© 1983 Burroughs Corporation CW-516

Introducing PC/FOCUS.
The end of the P.C./Mainframe software gap.

First there was FOCUS for IBM or compatible mainframes. A complete 4th generation language and information control system, FOCUS redefined the way applications were developed, by replacing conventional programming with non-procedural English sentences. This enables trained programmers to boost their productivity by hundreds of percent, while permitting end-users in the Information Center to perform their own ad hoc queries, reports and analyses.

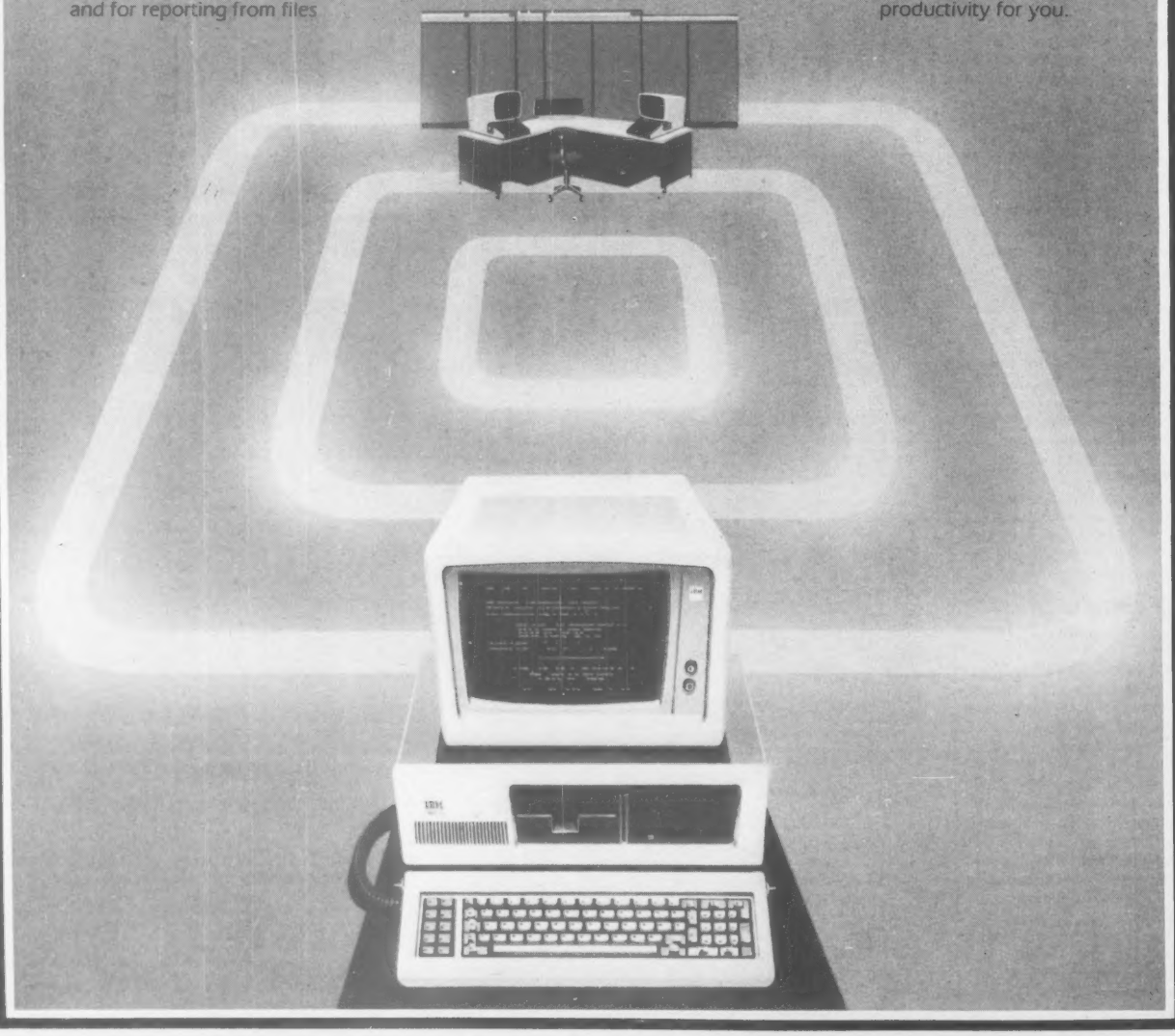
And now, there's PC/FOCUS for the IBM Personal Computer.

PC/FOCUS is a complete environment for developing local PC applications and for reporting from files downloaded from the mainframe. Plus, it provides a distributed processing environment where data base transactions are entered, validated and formatted locally, then sent to the mainframe for processing.

Additionally, PC/FOCUS enables you to prototype and test mainframe FOCUS procedures without consuming mainframe computer resources. Once developed, the procedures can be sent to the mainframe for production execution.

PC/FOCUS. It's the end of the PC/mainframe gap.

And the beginning of a whole new era of distributed productivity for you.



To learn more, write to:
Don Wszolek, Dept. CPC, Information Builders, Inc., 1250 Broadway, New York, NY 10001.

New York: (212) 736-4433 • Washington, D.C. (703) 276-9006
Chicago: (312) 789-0515 • St. Louis: (314) 434-7500
Dallas: (214) 659-9890 • Palo Alto: (415) 324-9014
Los Angeles: (213) 615-0735

PC/FOCUS

INFORMATION BUILDERS, INC.

Can Top Dollar Ensure Best Work?

Turnaround Time
By Larry E. Long

Q Our current costs for time-sharing services are in excess of $200,000 annually, so we've decided to move these services in-house. To help coordinate this effort, we have invited proposals from three consulting firms. I'm charged with evaluating the proposals and making a recommendation.

The details contained in our request for proposals were very explicit. Consequently, the scope of each proposal is about the same. What differs is the price tag.

The low bid was a fixed price from one of our time-sharing services. The high side of the two Big Eight accounting firms' estimates were about double the fixed-price bid. With cost the major criterion, the obvious choice is to go with the time-sharing service. However, both Big Eight firms claim they have more experience in this area.

My boss is leaning toward the low bid even though he has not read the proposals. Any ideas?.

A Whenever you make cost the major criterion, you are asking for trouble. The cost of a service has no meaning unless it is weighed against the end product's anticipated level of quality.

A common pitfall in assessing the ability of a consulting firm to perform quality work is to put too much emphasis on the company. To be sure, a company's reputation should be considered, but remember, individuals, not companies, do the work.

Ask who will be assigned primary responsibility for the project. If you're going to pay top dollar for an "expert," make sure that the expert will be doing the work. If there is any question about who will be assigned to complete the project, get it in writing.

Talk with each of the proposed principals. Assess their experience, interest and the extent of their personal commitment to the project. Frank discussions with the people expected to do the work should give you some insight into the disparity in prices and the quality of the end product.

Q After months of fruitless job hunting for a programming position, I gave up the idea of trying to work with DP equipment and started selling it. Therefore, to all those companies that would not even grant me the courtesy of an interview: I hope the hardware I'm going to sell you this year provides countless hours of unmitigated downtime, heartache and grief.

A That's fine, but don't forget that there is a direct correlation between the level of customer satisfaction and the size of your commission.

Q I interviewed with my present employer a year ago. I was offered $20,000 annually and a substantial pay increase six months later. I was also promised a six-month salary review in writing. I accepted the job offer based on these promises.

Eight months ago, management commissioned a consulting firm to determine whether employee salaries were comparable with salaries in the "market." The results of the study were never released.

About the time of my promised salary review, the company issued a memo stating that the future was bleak and that there would be an across-the-board pay freeze.

I have an accounting degree and five years of DP experience. My question is this: What can a DP professional do to assure that promises made as part of a job offer are kept? Apparently, just "having it in writing" doesn't mean much any more. Is there anything I can do, other than taking legal action, to get what I was promised? Do you think I am underpaid?

A If the promise of a "substantial pay increase" was in writing, then perhaps you have some legal recourse. However, I suspect that this promise was made informally by an overzealous interviewer. Such written statements are extremely rare and usually accompanied by a very explicit condition of performance.

As for the promise of a six-month salary review, your company should go through the motions even though the pay freeze is in effect. This is just good management.

Being underpaid is relative to your worth on the open market. The only way to find out your real worth is to make yourself available to potential employers.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

■ BDS / Dataproducts Plug-Compatible Printers
■ Built for Handling Continuous High-Volume Output

IBM · DEC · HP
BURROUGHS
BDS

■ Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
■ Over 5,000 Systems Installed
■ Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
■ 30-50% Savings
■ Quick Delivery (30 Days or Less)
■ Reliability Built-In (BDS Controllers and Interfaces)
■ Low Maintenance Cost
■ TRW Nationwide Service
■ Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers
☐ 55 CPS Daisy Wheel Printer
☐ 80-300 CPS Matrix Printer
☐ 300-2000 LPM Band Printers

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone (_____) _____

(415) 326-2115

BDS Corporation
1120 Crane Street
Menlo Park, CA 94025

U.K. (734) 730025 Australia (03) 241-8901

Dear David;

Computer Advice Columnist: David Jamison Carlyle

Dear David,

We've newly decided to make office automation, especially individual workstations, key in our growth plans. Right now, the issue seems to be video terminal equipment—which CRT, and from whom, *and* how to finance. Any suggestions?

Signed
Terminal Throes

Dear Term,

First, congratulations on the automation commitment! And, yes, I do have a suggestion, or rather, three—Lear Seigler, DJC and leasing.

For those workstation terminals, how about Lear Seigler video displays? One of the widest selections around plus high reliability and price performance have made Lear Seigler one of the finest names in the video terminal business.

Check out Lear's ADM 22—it's got full editing, all the popular attributes, 7 function keys, easy set up mode with status line, communications in block or conversation mode, and a full graphics option, all for a *very low price.*

As for the source, DJC is a leading supplier of datacommunications and microcomputer equipment to today's corporations—and tomorrow's. They also offer flexible rental and leasing programs specifically designed to make this equipment available to DJC customers, whatever their financing and budget requirements.

Call DJC. They'll not only get you the Lear terminals, but also finance and network them! Now, that's the service a growing organization needs!

David

Dear David,

We have always leased our computer terminals and datacomm equipment. But with today's lower cost devices, we now sometimes rent and sometimes purchase. Most of the leasing companies specialize in financial alternatives, but know little about computers and communications, and their purchase prices are just not competitive.

What we need is one vendor we can work with regardless of whether we rent or buy—who can give us technical support and help us evaluate our exact hardware requirements. Isn't there someone around?

Signed
Lease-Lorn

Dear Lorn,

Yes, there is—DJC. At DJC you can rent, lease or buy the industry's broadest selection of equipment—including microcomputers—at some very competitive prices. And benefit from their expertise in understanding each device or network of equipment and how it answers a particular application problem.

You probably know DJC as a broad-line data/telecommunications company. But it is also a leasing company. That means that once selected, your optimum equipment mix enjoys optimum financing arrangements—rent, lease or purchase.

The communications needs of today's corporations pose a complex question, and flexible rent/lease programs are just part of the DJC response.

David

Dear David,

There are matrix printers all over this place, from companies I've never heard of, and apparently from companies with no visible means of service support. Can't I get price, speed, and high quality printing *and* service from someone I know and trust?

Signed,
Alternatives, Please

Dear Al,

Of course you can, if you call DJC and ask for Diablo.

Yes, Diablo (a Xerox company, you know), makes matrix. And with the same quality that made them number one in daisywheel printers. They've got a family of *six* matrix printers that do up to 400 cps with a print quality that's simply outstanding. Even with graphics and 'near-letter-quality' you've got one of the quietest families around! And when it's service time, you get the nationwide network of Xerox service centers. *That* is support.

Why don't you call DJC? They'll not only help you select the best mix of Diablo matrix for your company, but they can probably deliver them right out of their stock. After all, they are the country's leading distributor of data and telecommunications equipment.

David

Address your computer communications problems to:

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Pkwy.
Culver City, California 90230

New York (212) 686-9774	Texas (713) 556-5512
New Jersey (201) 780-0802 (800) 526-2823	California: San Francisco (415) 254-9550
Illinois (312) 790-4466	Los Angeles (213) 410-9250
Colorado (303) 426-9508	Irvine (714) 851-5011
Hawaii (808) 531-5136	

Send for DJC's terminal comparison chart.

Green Light for Manhattan Traffic

NYC to Battle Traffic Jams With On-Line Cops

By Bob Johnson
CW New York Bureau

NEW YORK — New York City, one of the most progressive municipal users of computers in the U.S., is calling on technology to battle its traffic problem in Manhattan.

Manhattan suffers from "grid lock," a situation that occurs when many traffic intersections become simultaneously blocked. This occurs because most of Manhattan's streets are laid out in a grid pattern. When traffic jams at one intersection, the overflow jams the next intersection as well.

The city's decision to use computers as traffic cops stems from two considerations, according to Commissioner of Traffic Samuel Schwartz. First, traffic signals in most of the city's other boroughs are already controlled on-line by a central CPU.

Second, the computer appears to be a natural tool to solve the grid lock problem that has plagued Manhattan for some time.

In theory, the grid lock problem is basically mathematical, involving cross sections of city arteries of a certain size and the amount of traffic that passes through them.

There are 2,700 signaled intersections in Manhattan that have to be monitored along with an enormous amount of daily traffic, according to Schwartz.

For this reason, the Manhattan Computerization Project was characterized by the commissioner as the most ambitious and complicated of its kind. "What has to be looked at is the density, volume and speed of traffic," he said.

"In order to avoid grid lock, we will, with the help of the new system, try to keep a functional speed level, make sure density is not too high and monitor the volume of traffic so we know who we are serving."

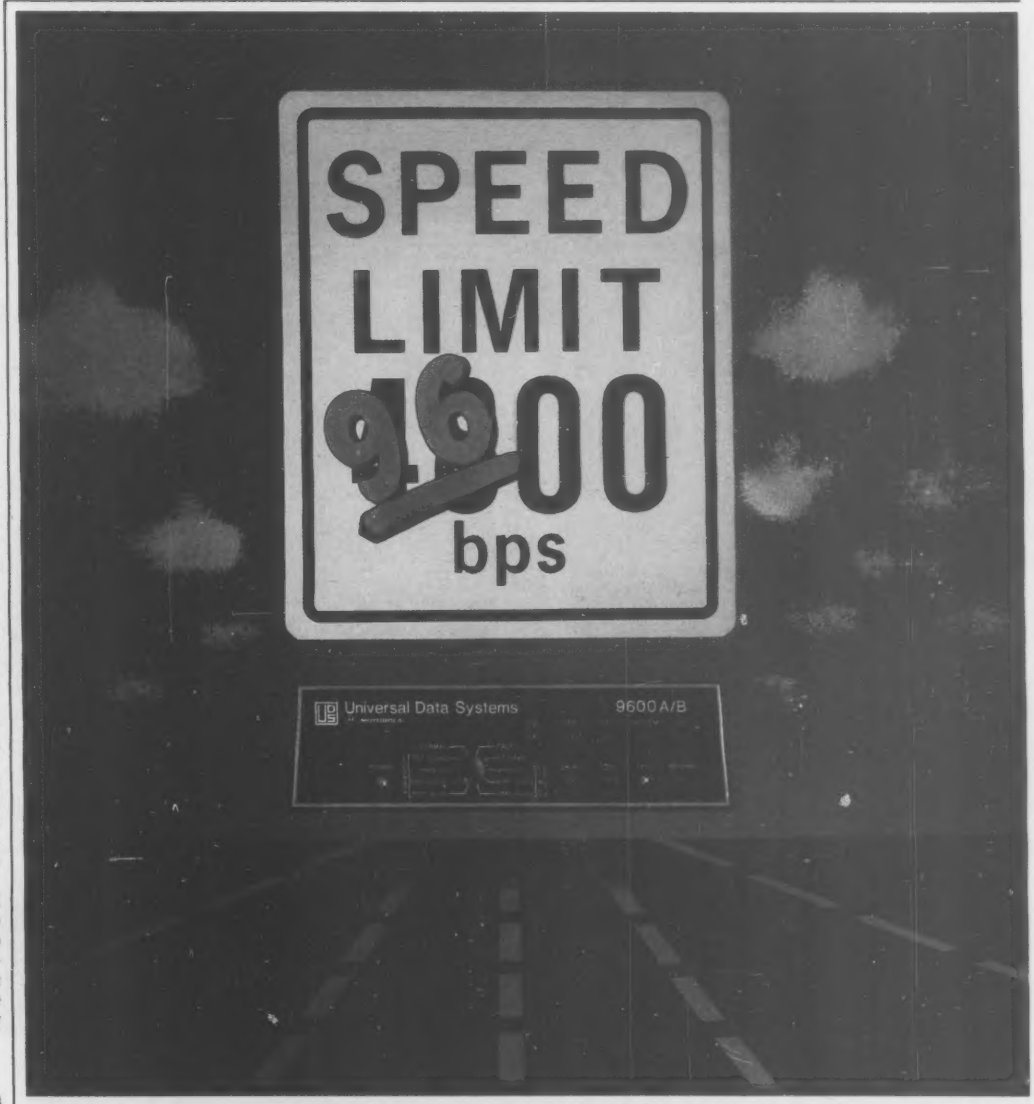
Two Traffic Studies

Two studies have been performed by Schwartz's department in an effort to employ the computer to alleviate grid lock. One of the studies involved the metering of high-density sectors; the other was a study of vehicles in motion (VIM). Schwartz explained that the metering study examined the densest street intersecplus/minustions to determine how they should be monitored and what kind of action should be taken to prevent grid lock. The VIM study analyzed and measured factors such as vehicle speed so that a model for keeping traffic moving could be created.

The new system, expected to have traffic signals on-line by 1984 and be completed by 1986, will measure the speed, volume and density of traffic on city streets. This data will then be fed via coaxial cable through programmable control processors that will handle the data's routing functions, then travel through five on-line IBM 1800 controllers into the Traffic Department's central IBM 370/158 mainframe in Long Island City.

At that point, the system's Vehicular Traffic Control System (VTCS) software will take over, according to Lee Holmes, the Traffic Department's chief of signals and communications. The VTCS, which controls the signals in most of the other city boroughs, was developed by IBM, but has been enhanced with information supplied by the two traffic studies. The traffic package will address the traffic demands on the city streets, as well as implement anti-grid-lock strategies, Holmes pointed out.

"Some 1,600 copper coil inductance loop sensors will be placed six inches below the surface level of the city streets in 6-ft by 6-ft rectangles," Schwartz explained.



UDS raises the speed limit for dial-up modems

At last there's a 9600 bps modem designed especially for the dial-up telephone network.

Our 9600 A/B is the ideal modem for projected system growth. Realize immediate line-charge savings by moving from 208 A/B to 9600 A/B now! Then, if your system demands dedicated lines, simple strap modifications will convert your modems. Nothing else changes!

A faster turnaround time than 208 A/B's further increases the 9600 A/B's efficiency. Multiple test modes are selectable from the front panel.

Contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; TWX 810-726-2100.

Universal Data Systems

MOTOROLA INC.
Information Systems Group

DISTRICT OFFICES:
Old Bridge, NJ, 201/251-9090 • **Blue Bell,** PA, 215/643-2336 • **Atlanta,** 404/998-2715 • **Chicago,** 312/441-7450 • **Columbus,** OH, 614/895-3025 • **Boston,** 617/875-8868 **Richardson,** TX, 214/680-0002 • **Englewood,** CO, 303/694-6043 • **Houston,** 713/988-5506 • **Tustin,** CA 714/669-8001 • **Sunnyvale,** 408/738-0433

NCC: Booth S-5218

Created by Daynor/Hall, Inc., Winter Park, FL

Construction Costs Profile
A - Materials (24%)
D - Land (27%)

The new TI Professional Computer. It's the answer for information systems managers.

When it's your responsibility to choose a professional computer, you look for the one that's not only powerful and easy to use, but is also expandable enough to meet your company's present and future needs. A computer that helps increase productivity. One with the advanced design to permit it to effectively co-exist with information systems, today and tomorrow. The new Texas Instruments Professional Computer is the answer.

It works with you and your system. The new TI Professional Computer has the memory, the software and the user-friendly design that will quickly help the unsophisticated user become more productive. Its versatile communications capabilities enable it to work well with mainframes and office automation systems.

High resolution displays with dedicated memory. You get brilliant full-color or monochromatic graphics and text displayed with extremely high resolution. And since our graphics board has its own memory, using graphics doesn't tie up the main memory. As a result, graphic displays appear on the screen much faster than other desktop computers.

An Easier-To-Use Low-Profile Keyboard. The slim profile of our keyboard features the popular typewriter layout and infinite height adjustment from 5 to 15 degrees slope. It also provides separate numeric keypad and cursor control clusters, plus improved key tactile response for quick positive entries.

It's the answer to your microcomputer needs. Now and in the future. All the leading operating systems and programming languages are available. You can use many popular application programs from the best software suppliers to help your managers generate spreadsheets, do word processing, construct graphics, communicate with other data bases and create their own.

Future enhancements will include speech recognition, speech synthesis, telephone management, natural language query capability with a true relational data base package. All this means greater productivity in your company today and tomorrow.

There's more information in store for you. It's simple to get more answers about how the TI Professional Computer can meet your needs. Just complete the coupon below and mail to: Texas Instruments, Dept. 1B, P.O. Box 402430, Dallas, Texas 75240. Or call toll free: 1-800-527-3500.

Creating useful products and services for you.

TEXAS INSTRUMENTS

SPECIFICATIONS

System Unit
16-bit, 8088 microprocessor
64K byte RAM, expandable to 256K bytes
4K byte graphics display memory
5-slot expansion bus

Keyboard
Specially designed low profile
Popular typewriter layout
97 keys, including 12 function keys
Separate numeric keypad and cursor control clusters
Tactile response, for quick positive entry
Upper- and lower-case letters

Display Units
12-inch monochrome (green phosphor) or 13-inch full-color, 25 lines x 80 columns
High resolution, 720 x 300 pixels

Mass Storage
Built-in 320K byte diskette standard
Additional internal storage of 320K byte diskette, or 5 or 10 Mbyte Winchester disks optional

Communications Options
300 BPS or 300/1200 BPS internal modem
TTY, 3780
3270 SNA stand-alone (Summer 1983)
3270 BSC and SNA cluster (Fall 1983)

Operating Systems
MS™-DOS, Digital Research™ CP/M-86®, and Concurrent CP/M-86™, UCSD p-System™

Languages
BASIC, COBOL, FORTRAN, Pascal

Applications Software
Over 100 programs available from the most popular software vendors such as Microsoft, Ashton-Tate, Micro-Pro, IUS, Sorcim, Peachtree, BPI, Lifeboat and others.

Printers (Available Spring 1983)
150-cps TI 850 Series for most applications

FOOTNOTES: MS-DOS is a trademark of Microsoft Corporation. CP/M-86 and Concurrent CP/M-86 are trademarks of Digital Research, Inc. UCSD p-System is a trademark of the Regents of the University of California.

Get the Answer. Please send more information about the new Texas Instruments Professional Computer.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: (____) _____ ☐ Have Salesman Call.

Return Coupon To: Texas Instruments, Dept 1B, P.O. Box 402430, Dallas, Texas 75240 DCA1B30W320C

Copyright © 1983 Texas Instruments

WIP Told to Adapt, Apply Skill to Firm's Style

By Patricia Keefe
CW Staff

WALTHAM, Mass. — Women who want to get ahead in the computer industry should adapt themselves to the style and organization of their chosen company, according to Rose Ann Giordano, manager of Digital Equipment Corp.'s Large Computer Group.

Giordano spoke here recently before the Boston Forum of Women in Information Processing (WIP).

She is currently responsible for the management of all DEC 36-bit products sold worldwide in the $750,000 range and up.

Giordano has been in the industry for 15 years. Starting out at Bell Laboratories with a degree in mathematics, she went on to spend nine years at Xerox Corp. in its computer division in marketing, sales and systems management before joining DEC.

"I've been lucky. I've had fun and I think I've done reasonably well," she said. She told the audience that during her career she has never encountered sex discrimination.

'Belligerent Feminists'

Pledging her support for equal pay and equal opportunity issues, Giordano nonetheless warned that "belligerent" feminists "do more harm than good. They get lip service and are passed over," she warned.

Instead, women should decide what they want to do and go out and get those skills, applying them in their own style.

DP has been "a boon to women," according to Giordano.

She said she was "encouraged" by the fact that 25% of the exempt work force at DEC are women. Giordano noted that more than 50% of the people enrolled in the most recent sales training classes were women.

"There's been just phenomenal growth here," she said, adding that women in sales are becoming commonplace.

Sales offers women visibility, the opportunity to run their own show, and "there's no question whether you're competent," Giordano told the audience.

Few at Senior Level

Not so numerous, she conceded, are the number of women at the senior level. "Obviously, the statistics here are not that good, but it takes time," Giordano said, estimating that the number of top-level female executives at DEC was 4% to 5% of the total number of executives in the firm.

One reason for Giordano's ascent from marketing into management is her tenet that "he who proposes, does." At one point, when she criticized how something was being handled, she was told "if you're so smart, you do it."

She drafted a proposal that was accepted and suddenly found herself a manager who had to build an organization from the ground up within six months.

Faced with the prospect of hiring 50 people, Giordano sat down and determined the "critical factors of success" for her project.

She noted the areas where she was weak and made it a point to "hire people who could help attain those factors.

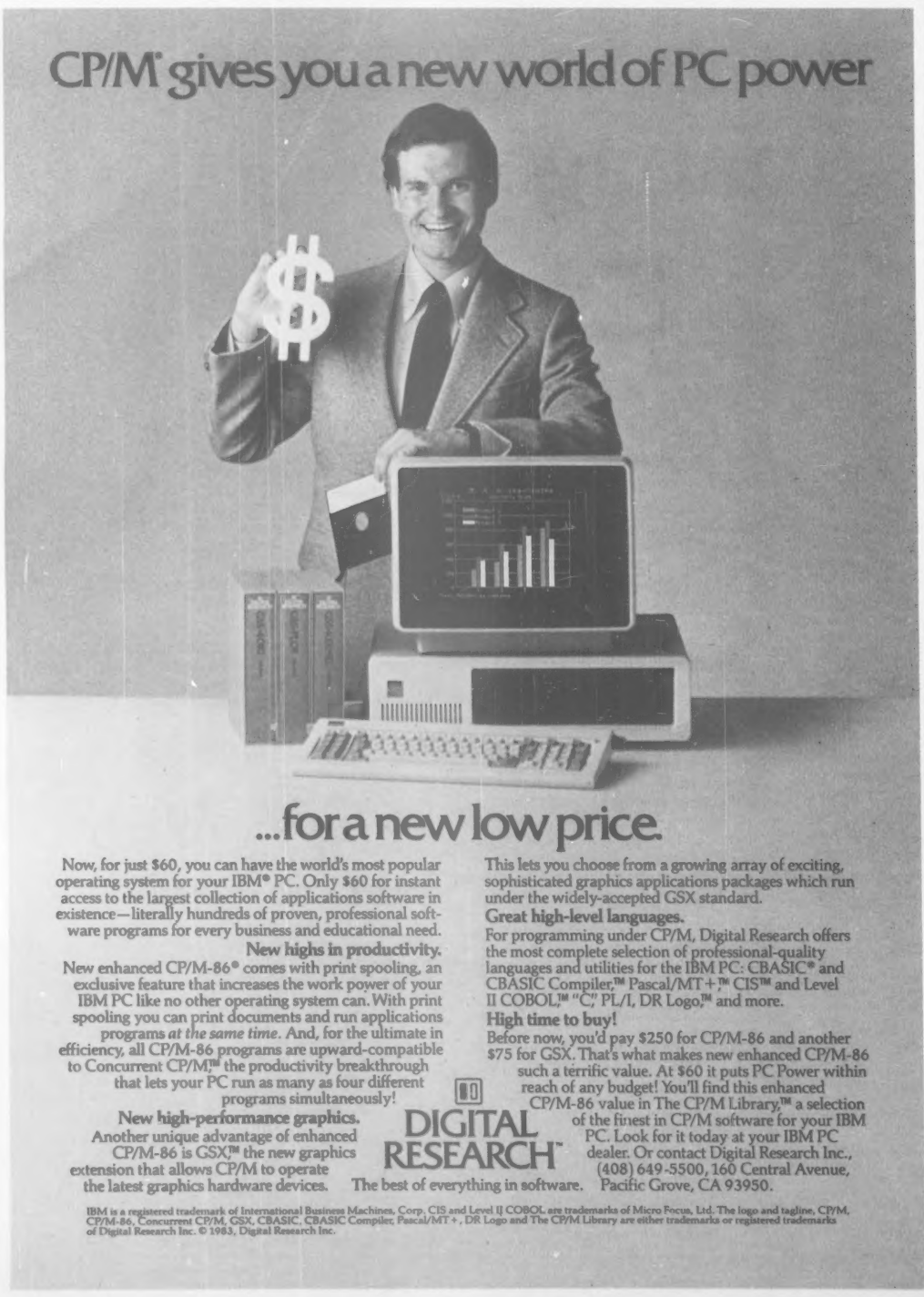
"People either hire in their own image or find people to complement their talents," she said.

For example, when Giordano, who had had no previous financial experience, realized her new position had endowed her with profit/loss responsibilities, she went out and hired a good controller.

Asked what women can do to get ahead, Giordano stressed the importance of education and training. She encouraged women with good, salable technical skills to consider forming their own ventures.

"There's a lot of venture money out there," Giordano told the group.

For women whose strongest skills are nontechnical, Giordano pointed to personal computing and office automation as areas of potential growth.


CP/M® gives you a new world of PC power
...for a new low price.
Now, for just $60, you can have the world's most popular operating system for your IBM® PC. Only $60 for instant access to the largest collection of applications software in existence—literally hundreds of proven, professional software programs for every business and educational need.
New highs in productivity.
New enhanced CP/M-86® comes with print spooling, an exclusive feature that increases the work power of your IBM PC like no other operating system can. With print spooling you can print documents and run applications programs at the same time. And, for the ultimate in efficiency, all CP/M-86 programs are upward-compatible to Concurrent CP/M,™ the productivity breakthrough that lets your PC run as many as four different programs simultaneously!
New high-performance graphics.
Another unique advantage of enhanced CP/M-86 is GSX,™ the new graphics extension that allows CP/M to operate the latest graphics hardware devices. This lets you choose from a growing array of exciting, sophisticated graphics applications packages which run under the widely-accepted GSX standard.
Great high-level languages.
For programming under CP/M, Digital Research offers the most complete selection of professional-quality languages and utilities for the IBM PC: CBASIC® and CBASIC Compiler,™ Pascal/MT+,™ CIS™ and Level II COBOL,™ "C," PL/I, DR Logo,™ and more.
High time to buy!
Before now, you'd pay $250 for CP/M-86 and another $75 for GSX. That's what makes new enhanced CP/M-86 such a terrific value. At $60 it puts PC Power within reach of any budget! You'll find this enhanced CP/M-86 value in The CP/M Library,™ a selection of the finest in CP/M software for your IBM PC. Look for it today at your IBM PC dealer. Or contact Digital Research Inc., (408) 649-5500, 160 Central Avenue, Pacific Grove, CA 93950.
DIGITAL RESEARCH™
The best of everything in software.
IBM is a registered trademark of International Business Machines, Corp. CIS and Level II COBOL are trademarks of Micro Focus, Ltd. The logo and tagline, CP/M, CP/M-86, Concurrent CP/M, GSX, CBASIC, CBASIC Compiler, Pascal/MT+, DR Logo and The CP/M Library are either trademarks or registered trademarks of Digital Research Inc. © 1983, Digital Research Inc.

Computer Thieves Snagged With 'Radioactive' Hoax

SPRINGFIELD, Mass. — Thieves who recently stole some computer equipment from a moving van here found the goods were a little too hot to handle — or so they thought.

After the theft of about $28,000 worth of Compugraphic Corp. terminal equipment was discovered, a fast-thinking police officer here planted a street rumor that the equipment was "highly radioactive." A local newspaper cooperated by printing the bogus story.

The next day a woman notified the police that the cache of computer equipment had been abandoned on her back porch. The woman was able to identify one of the two men who abandoned the equipment, which was retrieved unharmed.

In addition, the department received "three or four calls from people wanting to know if they should come in for treatment," according to Alvin Correira, one of two detectives who investigated the case.

Willie Nero of Springfield was charged with receiving stolen property valued at over $100. Correira said more arrests were expected.

A spokesman said the planted story was an experiment police used because they believed the equipment was still in the city. "We figured they probably stole [the equipment] because they thought they could sell it on the street. But in fact it has no value except to businesses that can use it," Detective James Lash said. "We were afraid when they found out, they would just damage it."

Correira said the department would "absolutely try [the experiment] again. If you make the assumption that people are scared of computers and that they're not very sophisticated about these things in the first place, you can bet it will work again."

Courses Target Programmers Using IBM's IAG

NAPERVILLE, Ill. — Deltak, Inc. has announced three courses to aid experienced programmers develop IBM DMS/CICS/VS applications using IBM's Interactive Application Generator (IAG).

The three technical courses are part of an eight-part multimedia series called "DMS/CICS/VS Application Development." They were in conjunction with Duotech, Inc. and were designed for students who have a programming background in any language and a basic familiarity with IBM 3270 series display terminals.

The courses are applicable to OS/VS or DOS/VSE installations that use IBM's DMS to develop applications, according to a Deltak spokesman.

The first course, "The Interactive Application Generator," offers an overview of the IAG, including a discussion of utility maps and a definition for application development, Deltak said.

"Application Development Using IAG" considers development of complete applications using the IAG, including correct definition of a file and its data record, according to the vendor.

"Additional IAG Processing Options" is an extension of "Application Development Using IAG" and addresses communications fields, multiple files in processing, multiple page panels, sequential files and the DMS browsing features, Deltak said.

The courses cost from $50 to $125 per month or can be purchased for $1,750 per course, Deltak said from East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

High Tech Repairs For Manufacturers Oem's Field Service Organizations

We are a large volume, high Tech depot repair and reconditioning center specializing in support of aging EDP product lines.

* **Manufacturers:** Let us show you how we can support your aging product lines cheaper and more efficiently. Frees your resources for development and the manufacture of new products.
* **OEM's:** We can support large volume peripheral devices and plug compatibles on a quicker turnaround basis than the manufacturer and at a lower cost.
* **Field Service:** Same benefits as OEM. Also, we can drop-ship repairables to your field offices reducing your shipping costs.

Printers - Disc Drives - Memories - Terminals
Power Supplies - PCB Assemblies

NATIONWIDE REPRESENTATION – CALL US NOW

COMPUTER SYSTEMS and SUPPORT
Division of TYMSHARE, Inc.
213-889-6031

Mercurion 1™

The page-per-second non-impact printer matched to your computer

...and priced to change all your thinking.

Now Mercurion 1 makes non-impact printing as cost-effective as it is performance-effective. Revolutionary ion deposition imaging—far simpler and more reliable than laser xerography—gives you letter quality printing, and on standard 8½ x 11 paper now demanded by government and most businesses. All of this, plus 5,280 lines-per-minute.

At an initial cost less than 50% that of conventional non-impact printer systems, Mercurion 1 also substantially reduces maintenance costs, downtime, and per-page operating costs. And does it quietly (55dBA).

A simple, user-friendly control panel lets you set margins and tabs, select fonts (up to 8 styles and sizes), program number of copies (1 to 255), feed a single sheet for alignment, put the system through self-test, and much more. Resolution is 240 x 240 pixels, and you can select landscape or portrait orientation.

Mercurion 1 is plug-compatible with all popular mini- and mainframe computers. It's designed to replace your existing impact line printer directly—no operating system software changes. We even supply the cable.

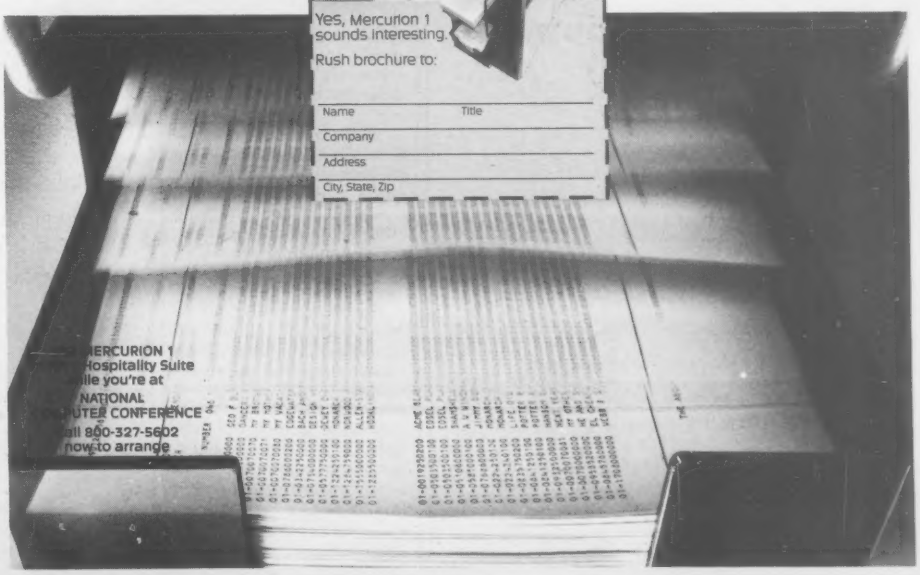
And you can count on SSI quality and service support. Thousands of our printer systems are in use worldwide.

Call us or mail the coupon below for a fully-detailed brochure on this great new printer system.

SSI Southern Systems, Inc.
2841 Cypress Creek Road
Ft. Lauderdale, FL 33309.
(305) 979-1000 (800) 327-5602
Telex 522135

Yes, Mercurion 1 sounds interesting.
Rush brochure to:

Name Title
Company
Address
City, State, Zip



Suit, Additions Blamed for Missed Deadlines

By Patricia Keefe
CW Staff

McLEAN, Va. — Litigation that is "driving us crazy" and unending additions to its initial Medicaid Management Information System (MMIS) proposal are what an official of Systems Development Corp. (SDC) here called the primary reasons that SDC failed to meet two deadlines for the implementation of an MMIS in Massachusetts (story Page 33).

Electronic Data Systems Corp. (EDS) — an unsuccessful bidder for the contract that has filed a lawsuit against both SDC and the commonwealth of Massachusetts — "will continue this lawsuit forever, spending as much money as possible on it," SDC Services Group President Edward Doyle said in a recent telephone interview. Doyle contended that EDS' actions helped delay both the initial signing of a contract between SDC and the state as well as the subsequent required federal approval.

According to Doyle, after the state announced its decision to award the MMIS contract to SDC, EDS charge that some of the features outlined in the winning bid, which were based on SDC's MMIS implementation in Florida, did not exist. Massachusetts officials organized and sent a special committee to Florida to examine that state's MMIS software and speak with Florida officials about the SDC-developed system. Upon their return, committee members submitted a report to the Massachusetts governor's office "that proved we were right and EDS was wrong," Doyle said.

When the contract between Massachusetts and SDC was finally signed in September, after a two-month delay while EDS, charges were checked out, work under the contract was hampered by a front-page clause that declared the contract "useless as long as it was not approved by federal officials," Doyle said. While federal approval is ordinarily little more than a formality, the SDC executive charged that because EDS took its story to federal officials, who then checked SDC, formal approval of the contract did not come until last Dec. 8. It was this delay of the delivery of a certified contract that most severely hampered SDC's efforts to meet its first deadline for MMIS, Dolye said.

EDS' next move, according to Doyle, was to charge collusion between SDC and the state. When a probe instigated by the Massachusetts Attorney General's office rejected EDS' charges, EDS filed suit against the state.

"We asked to be included as defendants in the suit because states usually don't have the legal resources to fight these things," Doyle said, charging that EDS "tries to intimidate" states in this manner.

Responding to EDS' charge that SDC offered a job to a state employee, Doyle said the employee answered a newspaper advertisement but was not offered a job.

SDC failed to meet the March 31 extended deadline for MMIS implementation because of the "hundreds of changes" made to the baseline system by the state, Doyle said.

Doyle also complained that the state's policy of having an outside group test each subsystem is "stringing out" the testing period.

Mass. System Includes Manual DP

BOSTON — Although it is trying to implement a Medicaid Management Information System (MMIS), Massachusetts does not rely solely on automated processing of its estimated 17 million Medicaid claims each year.

Processing efforts are divided between manual and automated methods. The state Medicaid office, which operates under the auspices of the Public Welfare Department, divides the processing of Medicaid claims between two subcontractors and the state's own internal computer system, overseen by the Office of Management Information Systems.

The Medicaid processing is done on several computer systems that are incompatible, according to a welfare department spokeswoman. As a result, each system can only do part of a job. The commonwealth's portion of Medicaid processing is run on an IBM 3033 and a minicomputer.

Massachusetts handles its own data entry. The Medicaid office has a facility in Westboro, Mass., which primarily handles the manual processing of hard copy on about 45 data entry terminals.

Subcontractors include Blue Cross/Blue Shield of Massachusetts, which handles Medicaid/Medicare crossovers, and Pilgrim Health Applications, Inc., which handles pharmaceutical, dental and medical service billings.

The current system, which Steve Buchner, contract administrator for the MMIS project, described as "patchworked," runs 10-year-old software. The present MMIS contractor, Systems Development Corp., has contracted to provide Massachusetts with a certified base system, taken from its similar Florida operation and customized for the commonwealth.

OUR PRIME COMPUTERS COST LESS

Saving you up to 50% on your hardware needs

YOUR ALTERNATIVE SOURCE FOR PRIME COMPUTERS AND PERIPHERALS

1st solutions
...The Alternate Source
A Datamation Services Inc. Company
2001 East Campbell Avenue
Phoenix, Arizona 85016
(602) 957-0999
Ask for Don or Matt

Improve Systems Productivity With
System Development

A monthly newsletter on improving the productivity of EDP Systems Development

User Experiences
Case Studies
Conference Reports
Literature Reviews
Products & Services

$75.00/Yr.

- Keep up-to-date on the latest developments in productivity improvement
- Save time each month in reading and research—we bring it all together
- Just one important idea could save you thousands in development costs

Return this coupon for a sample issue.

Applied Computer Research, PO Box 9280, Phoenix, AZ 85068
Yes, please send me a free sample copy of System Development, with no obligation.
Name _____
Title _____ Phone
Company _____ (602)995-5929
Address _____
City/State/Zip _____

LEARN CICS THIS SUMMER

COURSE	JUNE	JULY	AUGUST
APPLICATION DESIGN	NYC 5/31-6/3		LA 8/1-4
COMMAND LEVEL PROGRAMMING	NYC 6/27-7-1 CHI 6/20-24		NYC 8/1-5 SF 8/8-12
COMMAND LEVEL INTENSIVE (2 wknds)	NYC 6/18-19 6/25-26		NYC 8/20-21 8/27-28
MACRO LEVEL PROGRAMMING	NYC 6/13-17		
INTERNAL ARCHITECTURE	CHI 6/27-7/1	NYC 7/25-29	
PERFORMANCE DESIGN		NYC 7/6-7	

Not all CICS courses are alike. Only SysEd prepares reference manuals full of real life sample programs and case studies—the kind you'll need and use long after you've taken the course. Only SysEd has fully equipped Computer Labs where you'll spend hours in workshop sessions actually programming CICS on our 4341 computer using 3270's dedicated to the class. Classes are held in New York City, Chicago, Los Angeles and San Francisco. SysEd course offerings are also available for on-site sesions at company installations. On-site courses can include the same case studies and hands-on approach as our public courses, or can be customized to your particular application or project. So get smart this summer, call David Shapiro (212) 889-3386.

SYS-ED®
ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3386

CYBIL™

CYBIL is a high-level software language for use with CYBER 170 Series 800 computer systems and the NOS-2 Operating System.

It is a feature-rich, structured language for the development of software applications.

For further information, contact Systems and Services, Control Data Corporation, HQW10H, P.O. Box 0, Minneapolis, MN 55440.

CONTROL DATA

CYBIL is a trademark of Control Data Corporation.
©CDC 1983

Could Lose 25% of Reimbursements

Mass. Medicaid Management System Stymied

By Patricia Keefe
CW Staff

BOSTON — The six-year effort to implement a Medicaid Management Information System (MMIS) in Massachusetts has been stymied again, this time by missed project deadlines and an unsuccessful bidder's lawsuit.

According to Massachusetts officials, MMIS contractor Systems Development Corp. (SDC) is not only having trouble meeting its deadlines but — along with the commonwealth itself — is being sued by Electronic Data Systems Corp. The suit, which alleges that irregularities took place during the bid selection process, has prompted a state Ethics Commission probe.

These snafus could impact federal reimbursement for administrative costs generated under Medicaid. It could also hamstring recently elected Gov. Michael S. Dukakis' attempts to balance his proposed budget for the next fiscal year.

Incorporated into that budget are projected direct savings of $6.7 million that would be realized from an operating MMIS.

A spokeswoman for the Massachusetts Department of Public Welfare said "there is a great deal of dissatisfaction with SDC." The state was supposed to have its MMIS up and running on March 31.

The Department of Public Welfare, which administers the Medicaid program, has asked the U.S. Department of Health and Human Services (HHS) to waive penalties that could be assessed against the state under the so-called Schweiker Amendment for the delay in implementing MMIS. The state expects an answer to its request within two weeks.

If its request is denied, the commonwealth stands to lose at least 10% and potentially up to 25% of administrative reimbursement funds provided by the federal government until an acceptable computer system is up and running.

If the state is fined, it probably will fine SDC in turn, Assistant Welfare Commissioner for Medicaid Dennis Beatrice said.

The penalties could cost the state $2.4 million by the end of the year, estimated Alfred Fuoroli, regional associate administrator for the Healthcare Finance Office of the HHS. The projected $2.4 million loss is in addition to the $1 million per month that critics estimate Massachusetts is already losing because of its failure to implement MMIS.

That failure is not due to a lack of trying. Since 1977, the commonwealth has awarded three contracts to streamline the automation of its Medicaid claims processing. Two of those contracts were canceled.

A bidding dispute in 1977 resulted in the withdrawal of a contract award to Blue Cross/Blue Shield of Massachusetts and consequent contracting with Pilgrim Health Applications, Inc. in 1978. Two years later, Pilgrim was fired — the result of an "amicable agreement" — for failure to meet its deadlines [CW, April 21, 1980].

The current MMIS project undertaken by SDC has been delayed almost from the start, when the signing of the contract was held up for several months while the state examined charges of collusion between SDC and state employees. The state attorney general's office eventually ruled that an offer of employment made by SDC to one Welfare Department employee, which was not accepted, did not constitute conflict of interest.

SDC's four-year contract, which has an option for two more years, could net SDC up to $75 million, according to contract administrator Steve Buchner. It covers the processing of approximately 17 million Medicaid claims totaling about $1 billion, at 42.5 cents per claim for the first year.

Federal officials, wary of the commonwealth's past history in automating Medicaid, inserted a clause into its contract for system implementation reimbursement with Massachusetts that will allow the U.S. government to recoup its entire investment if the project fails to get off the ground, according to Fuoroli.

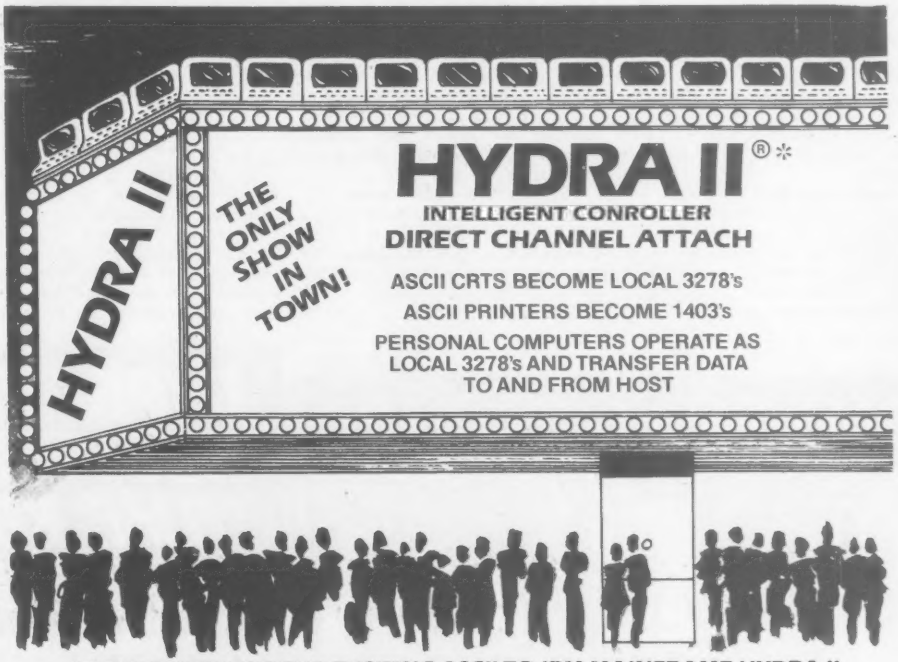
MIC Report Evaluates Lisa

CHERRY HILL, N.J. — Management Information Corp. (MIC) has presented what it calls a "thoroughly objective evaluation" of Apple Computer, Inc.'s Lisa microcomputer in its April edition of "Officemation Products Reports."

The 19-page report evaluates Lisa and compares it with Xerox Corp.'s Star, IBM's XT and Digital Equipment Corp.'s Professional 350, according to the vendor.

The report on Lisa can be obtained either by subscribing to MIC's "Officemation Product Reports" ($295/year) or purchasing a single copy of the report for $35.

MIC is located at 140 Barclay Center, Cherry Hill, N.J. 08034.


HYDRA II
THE ONLY SHOW IN TOWN!
HYDRA II®*
INTELLIGENT CONROLLER
DIRECT CHANNEL ATTACH
ASCII CRTS BECOME LOCAL 3278's
ASCII PRINTERS BECOME 1403's
PERSONAL COMPUTERS OPERATE AS LOCAL 3278's AND TRANSFER DATA TO AND FROM HOST

LINE UP NOW FOR THE EXCITING ASCII TO IBM MAINFRAME HYDRA II DIRECT CHANNEL ATTACH CONTROLLER.

HYDRA II is your ticket to cost effective communications

- No remote 3705 or other front end
- No remote software
- No protocol converter
- No additional controller
- Remote dial up devices look local to host

HYDRA II features for ASCII devices:

- 3270 Emulation CRTs and PC's
- Serial printer as mainframe printer
- Data transfer for PC's
- Menu driven port device selection
- Baud rates to 9600
- No keyboard lock
- Redundant data suppression
- And much more!

ddri
diversified data resources, inc
25 mitchell blvd suite 7 san rafael ca 94903
(415) 499-8870

*Marketed and distributed by Diversified Data Resources, Inc
Manufactured by JDS Microprocessing, Mission Viejo, CA

Please send me more information on the HYDRA II.
NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____
CITY: _____ STATE _____ ZIP _____
PHONE: (_____) _____ CPU _____ OPSYS _____

diversified data resources, inc 25 mitchell blvd suite 7 san rafael ca 94903 (415) 499-8870

Using Superminis, Minis, Micros

Airline Steers Its Own Distributed System

DENVER — The DP department of an airline here is hoping the old saying about the third time being a charm will hold true for its new system, which is currently under development. Instead of utilizing big mainframe processors, the airline's system uses superminicomputers, minicomputers and microcomputers in a distributed system that will eventually link the host processors here with smaller systems in 80 airports.

Frontier Airlines has something of a checkered past when it comes to computer systems. Back in 1968, the firm had three IBM 360 processors and was one of the first users of IBM's Programmed Airlines Reservation System. Two years later, there was a management shake-up at Frontier.

The new management decided Frontier was spending far too much on computing and ordered the 360 systems scrapped. At that point, Frontier started doing its data processing through a service bureau, according to Lowell R. Shirley, Frontier's senior director of information services.

Eleven years later the airline had become more financially secure. The government had deregulated airline travel, and the data processing work load had increased tenfold. Once again, Frontier decided it needed its own computer system.

But this time things were going to be different. The firm decided to build a network of IBM System/38 processors, Series/1 minicomputers and Personal Computers.

Shirley said that when he came to Frontier from Bechtel Corp. in the summer of 1981, his first task was to find out exactly what condition the existing information system was in and how it was perceived by the user divisions.

Not Economical

Based on a consultant's evaluation conducted in early 1981, Shirley determined that the airline's reservations system, which was leased from Continental Computer Services (a division of Continental Airlines), was adequate. He decided it was probably most economical to continue sharing the reservations system with Continental.

A further review of Frontier's DP needs, Shirley recalled, revealed about 95% of the data used at Frontier was generated in-house. The remaining 5% came from outside sources like the Federal Aviation Administration (FAA).

Shirley also determined that only 5% of all the firm's data had to be in a real-time mode. That meant 95% of Frontier's data could be updated by the close of the next business day and still be considered timely.

In devising a system to meet its needs, Frontier decided to develop most of the software for its new system in-house. Shirley said this decision was made because all of the commercial airlines software packages on the market were developed for other airlines and would have to be revised to meet Frontier's needs. To modify the programs would have taken as much time as simply developing a new, specialized package, Shirley maintained. However, some financial packages were purchased and integrated into the system, he added.

Shirley recommended the System/38 because he had used the processor while at Bechtel, where he was manager of software development. At Frontier, Shirley's strategy was to develop a central processing system of multiple System/38s capable of transferring data between machines. Frontier currently has three System/38 Model 7 processors installed with a fourth Model 8 processor scheduled for delivery in about six months.

Not Without Risk

But the decision to use System/38 is not without risk. Shirley noted that based on his experience at Bechtel, the System/38 can be a great boon to productivity. However, he is still concerned whether IBM will announce hardware and communications enhancements to System/38 fast enough to keep up with Frontier's needs.

"So far, IBM has provided what we need as fast as we could use it. Our risks appear to have been worthwhile," Shirley said.

With the System/38 processors installed at Frontier's corporate headquarters here, the next step in Shirley's information services strategy is, he said, to provide DP services to the 80 airports Frontier serves.

Since Frontier had already decided to keep the reservations system separate from the DP system, Shirley said, there is no real need to bring information generated at the 80 airports back here for processing. Instead, Frontier plans to build a network of IBM Series/1 minicomputers located at each of the major airports to process data.

At the heart of the network is a group of Series/1 processors and specialized message-switching software developed by Systar Corp. The group of Series/1s will also provide data concentration for exchanging information with the Continental reservations system and provide a link to other processors such as the host processors at the FAA. Installation of the Series/1 processors is expected to begin in August or September.

The final step in the Frontier system is to incorporate microcomputers — IBM Personal Computers — into the System/38 network.

VAX/VMS SOFTWARE

RESOURCE MANAGEMENT and CHARGEBACK SYSTEM

DP Managers use ARSAP for:

- User and Project Accounting
- Monitoring Usage and Trends
- Controlling Performance
- Billing for Services

Also Available for RSTS and RSX Systems

GEJAC INCORPORATED
P.O. Box 188
Riverdale, MD 20737 (301) 864-3700

VAX, RSX, and RSTS are trademarks of the Digital Equipment Corp.

IMPROVES RESPONSE TIME FOR REMOTE USERS!

Follow The Lead Of Leaders Such As RCA Corporation.

New Speed! New Efficiency! And it reduces the need to add new hardware!

Performance? You Bet!

- *Instantly improves CRT response time.*
- *Improves CICS/printer speed.*
- *Reduces line busy and front end loads.*
- *Gives new life to slower circuits.*
- *Simplest product you will ever install.*

Here's Two Good Reasons Why You Should Call Today:

- *CTOP® is site licensed at $2,500.*
- *Free trial before you buy.*

CALL: (208) 377-0336

H&W COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc., P.O. Box 4173, Boise, Idaho 83711

CICS Solutions

Moving to Bundled Packages

Micros Seen Impacting Graphics

By Patricia Keefe
CW Staff

TARPON SPRINGS, Fla. — Microcomputers are having a large impact on the business graphics market and changing the profile of graphics users, according to Deborah Kelly, manager of computer graphics research for International Data Corp.'s (IDC) Los Angeles office.

Kelly spoke here recently at a focus group on office graphics at IDC's 14th Spring Executive Conference.

Presenting a recently completed IDC study, she predicted that the business graphics market as it is known today is likely to disappear as vendors increasingly integrate graphics into bundled packages.

According to the study, graphics use and productivity were found to increase after the installation of a business graphics system. At least 36% of those users with increased use found they needed more system capacity, and 30% plan to purchase more graphics software and hardware over the next two years, Kelly said.

The use of microcomputers to create business graphics has risen sharply, with 40% of the users falling in that category. Microcomputer use is gaining fast on the use of general-purpose host systems; only 48% of the respondents took that route, she added.

These results indicate a shift in business graphics use since 1979, according to Kelly. For example, a similar study completed in 1980 found that 75% of business graphics users were from large firms. In addition, sales presentations were cited as the primary use for graphics.

This is no longer true, Kelly said. Fifty-one percent of the users in the 1983 study were from small companies. Between 80% and 90% of users overall reported that more managers are using business graphics as a form of decision support for forecasting, planning and business analysis.

But those managers are not always the creators of the business graphics they use. "Vendors need to pay more attention to designing systems that nontechnical managers can use," Kelly said.

The ideal package should be interactive and provide direct access to the company's main data base, she added. Direct access is currently most pervasive at sites where business graphics systems are run on a mainframe or minicomputer (60% of users), Kelly said.

However, as more and more graphics packages are designed for microcomputers, Kelly expects to see more access to mainframe-based information for the microcomputer user.

User perception of the importance of ease of use and flexibility has increased since 1980, Kelly said. "Users want their systems to do more," she added.

While the use of color has increased, users are generally willing to trade off many colors for lower cost, according to Kelly.

Major trends in store for the business graphics market, according to Kelly, include standardized formats, micro emphasis, improved ease of use, better data base access and more and better low-cost color.

TRS-80 MODEL 100

Monthly magazine loaded with Software and Hardware Reviews, Useful How-to Tips, Program Listings, and Accessory Interface Suggestions for this unique new computer. Whatever your interest in this notebook size portable, this exclusive publication will help you realize its maximum potential while saving you money. Regular subscription rate is $24/year (12 issues), however charter subscriptions are available for a limited time at $9.00 for 6 months or $16.00 for 12 months. [VISA] [MC] customers call 800-227-1617 ext 425
In California 800-772-3545 ext 425 or send check or Money Order to:

briefcase portable
560 South Hart Avenue, Suite 447 • Danville, CA 94526

The terminals that face up to everyone's problems.

Now Qume offers a line of three CRT terminals that help you face every one of your company's needs: The Qume QVT™ series.

The low-cost Qume QVT 102™ has all the best features of the four most popular terminals and can emulate all four with a keystroke! QVT 103™ is code-compatible with the DEC VT100/VT 131 and offers 80 or 132 character/line, split screen and up to 4 pages of memory. And QVT 108™ faces up to the most demanding jobs with 22 function keys, 13 editing functions and 2 pages of memory.

Qume QVT terminals all share striking ergonomic design. Tilt/swivel screens in green or amber. Detached, low-profile keyboards. Big 9 x 12 character cells. And a long list of other features to make people more comfortable and productive.

Best of all, Qume QVT terminals are very competitively priced. You can have performance, features and reliability without facing a budget problem.

Talk to your Qume sales office about filling all your terminal needs with a single purchase of QVT terminals. Or write Qume, 2350 Qume Drive, San Jose, California 95131.

One size fits all.

Qume
A Subsidiary of ITT

QUME CORPORATION
HEADQUARTERS
2350 Qume Drive
San Jose, CA 95131
CALIFORNIA
San Jose (408) 995-6144
Culver City (213) 410-1458
Santa Ana (714) 957-4040
COLORADO
Aurora (303) 752-3000
ILLINOIS
Palatine (312) 991-7250
OHIO
Dayton (513) 439-0469
TEXAS
Irving (214) 659-0745
NEW JERSEY
Edison (201) 225-5005
MASSACHUSETTS
Bedford (617) 275-3200
GEORGIA
Decatur (404) 284-8500
GERMANY
Düsseldorf PH: 211743016
ENGLAND
Reading, Berkshire
PH: 734-584-646
FRANCE
Boulogne PH: (1) 6082334
CANADA
Quebec PH: (514) 695-3837

Combines WP, DP Functions

N.J. School Board Makes the Grade With System

TRENTON, N.J. — An integrated information system that combines data and word processing functions has saved the New Jersey School Boards Association (NJSBA) $12,000 per year in service bureau costs.

In addition, the system has expanded services to members, improved office staff productivity and allowed the group to draw on all of its data bases to generate personalized letters, notices and reports.

"We are doing things we never dreamed of before," Dr. Frank Steffero, assistant director of the association's Management Information Department, said.

Like other state school board associations, the NJSBA has a twofold mandate: to speak out for the interests of schools and students and to supply the information that board members need to oversee their districts.

Since the early '70s, the group had used service bureaus to compile statistical reports, maintain its membership list and produce mailing labels. "I could tell you some real horror stories about that," Steffero explained.

Need for Flexibility

Then in 1975, two IBM mag card typewriters were brought in to process paperwork for the Legal and Governmental Relations Department. These moves toward automation, helpful as they were, still did not give the group the flexibility it needed.

For example, even small batches of mailing labels required a two-day wait. "That didn't make our lobbyists very happy," Steffero said, "because for an urgent legislative notice, we'd need to get mailings out within hours of the time an issue became important."

Such drawbacks prompted a review of the NJSBA's data and word processing needs. In 1979, Steffero undertook a study of available equipment that would combine both functions in one system, use the vendor's own word processing software and cost under $100,000.

As it turned out, only one such system was available in 1979 — the Wang Laboratories, Inc. VS computer. "We kept asking for a system that would let us move our data back and forth easily, but all the other vendors said, 'We'll have it next year,' " Steffero said. The other vendors included IBM, Digital Equipment Corp., Burroughs Corp., NCR Corp., Micom Systems, Inc. and A.B. Dick Co.

So in 1980, the association purchased a VS 80 with 256K bytes of main memory, a 90M-byte disk storage device, a diskette drive and communications capabilities.

Two word processing workstations and one data processing workstation, a 40 char./sec, letter-quality daisywheel printer and a 600 line/min draft printer were part of the original system. To date, three more workstations and a second daisywheel printer have been added.

The group also installed a Wang Word Processor System 20 with two CRT terminals and a 40 char./sec daisywheel printer at its headquarters, a short distance away from the office building that houses the VS.

The group's central data base is its Membership System, containing the names and addresses of 5,000 board members from the state's 611 school districts, along with pertinent information such as terms of office.

Names and addresses of legislators and other key decision makers in the field of education are also included.

NJSBA now has complete control over its mailings. "We have about 10,000 names and we've designed the system so that an authorized employee can select by choosing from a series of menus on the screen," Steffero explained.

INTRODUCING V
BUY ONE.

Introducing the one printer so versatile, it's like getting three. The VersaPrint 500™ Series printer is a full-color graphics printer. A near-letter-quality (NLQ) printer. And a high-speed dot matrix printer. All in one.

It's the only printer you need. For office applications. Data processing applications. Or manufacturing applications.

That's because it's the only printer that offers all this:

NLQ printing.
Graphic capabilities. (72 x 72 and 144 x 144 dpi)
Quiet operation. (55dB)
Color printing.
Both tractor feed and friction-feed cut sheet handling.

Now you can have graphics for design

Quieter than a typewriter.

Sales & Service: Boston (617) 456-8228 • Chicago (312) 279-7710 • Houston (713) 780-9440 • Los Angeles (714) 774-1010, Ext. 219 • Philadelphia (215) 245-4080 • San Francisco (415) 828-6941 • England (04867) 80666 • From the states of CT, DE, MA, MD, NJ, NY, RI, VA and WV (800) 523-5253.

Oil Firm's System Drills for Profits at Well Sites

BARTLESVILLE, Okla. — The complex process of evaluating the profitability of prospective drill sites is nothing new to Phillips Petroleum Co.

Since the oil company integrated computers into its evaluations and forecasts, the process has been streamlined considerably. And since the company installed Cincom Systems, Inc.'s Series 80 Mantis application development system 2½ years ago, geologists and engineers at Phillips report that analysis and calculations that previously took four to eight hours to do are now completed in 15 minutes.

Detailed, accurate projections of well production are needed for internal decision making, as well as for reports to the U.S. Securities and Exchange Commission, noted Bob Hindman, project director at the company's headquarters here.

"The need to automate the forecasting procedures with an interactive, on-line system had been obvious for some time," Hindman said. "But before Mantis became available, we had not even attempted the applications because conventional methods such as command-level CICS or IMS were too cumbersome and consumed too much of the data processing resources."

According to Murphy Canon, senior systems specialist at Phillips, the firm looked at about 12 packages and decided on the Mantis system for its interactive programming capability, screen design and filter definition.

For end users, the Mantis system brought about important improvements, Robert Hite, senior evaluation specialist for the company, said.

"The Mantis system has made it possible for us to have instant answers to questions about whether to drill at a particular location," Hite said. "Before Mantis, I had to wait for batch reports — which meant a four- to five-hour delay. With Mantis, I enter new data and get immediate results based on the updated information."

Tony Canfield, an engineer in Phillips' Houston office, also praised the system.

"Before Mantis, I often spent half a day gathering information before I could even do a decline curve analysis to forecast well production," Canfield said. "With Mantis, access to the data is immediate, and even generating the curve is automatic through an in-house developed graphics system. In less than 15 minutes, I have the completed analysis."

Development Team

The Mantis system has also proved helpful for the Phillips development team, which combines DP and non-DP professionals working together to build applications.

"One of the problems we faced in getting applications into the hands of the users was the lack of programmers experienced in developing on-line, interactive applications," Hindman explained. "Mantis enables us to improve the overall productivity of our programming staff by 200% to 300%, compared with using traditional programming languages.

"Mantis is also versatile," Hindman added. "It can be used for scientific and technical applications as well as business applications. This was important for the acceptance of technical people who are traditionally oriented to languages like PL/I and Fortran."

Phillips' reserve/production forecasting system utilizes graphics developed in-house using Mantis to plot decline curves. The curves are based on historical data and the engineer's best judgment forecast of the volume of remaining reserves yet to be recovered, the yearly production volume and the life of a well or lease.

"Our users are extremely pleased with the systems developed using Mantis," Hindman said. "And from DP's point of view, Mantis has provided important productivity improvements, as well as other benefits, including a high level of support from users, a results-oriented approach to solving problems, a highly flexible system and ease of response to change."

ERSAPRINT 500.™
GET THREE.

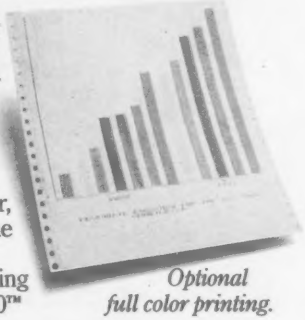
applications on the same high throughput printer that gives you 136 columns for spreadsheets and reports. And all this on an NLQ printer that's actually more quiet than a typewriter.

You can run it at 180, 90 or 45 cps, for draft, memo or NLQ quality. At any speed, with its 1.5 billion character printhead you know it's reliable.

VersaPrint 500™ is another innovative implementation of state-of-the-art technology from Lear Siegler, the world's favorite manufacturer of reliable, high quality terminals. It's backed by the broadest network of full service centers anywhere, with walk-in Express Depot™ service, on-site service and extended warranty service in 3,000 cities nationwide.

Call 800-LEAR-DPD or 714-774-1010 for more information and the name of your nearest distributor.

Remember, there's only one printer that offers everything VersaPrint 500™ offers.



Optional full color printing.

The one printer versatile enough to replace three.

Please send me further information about the VersaPrint 500™ series. CW5/16

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

ZIP _____ PHONE _____

Mail to: Lear Siegler Data Products Division
714 North Brookhurst St., Anaheim, CA 92803
Or Call: 800-LEAR-DPD (800-532-7373)

LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

EVERYBODY MAKES PRINTERS. ONLY WE MAKE LEAR SIEGLERS.

OEM Sales: • Chicago (312) 279-5250 • Houston (713) 780-2585 • Los Angeles (714) 774-1010, ext. 582 • New York (516) 549-6941 • San Francisco (415) 828-6941 • England (04867) 80666 VersaPrint 500™ and Express Depot™ are trademarks of Lear Siegler, Inc.

See us at NCC booth #5140

Ease of Use Important, Too

System's Cost Bottom Line of Firm's Choice

MONTERREY, Mexico — Time-sharing capability and ease of use were important. But a saving on the bottom line was the chief requirement when Valores Industriales SA here was selecting its computer system.

Encompassing several companies organized into five divisions, Valores Industriales is considered one of Mexico's largest corporations, with 37,000 employees.

The company's largest division is Cerveceria Cuauhtemoc, SA (CCSA), a brewery founded in 1890. Today, CCSA produces 264 million gallons of beer annually. Most familiar to the U.S. are Carta Blanca and Bohemia.

Other operations include a fast-food chain; a soft drink division; a beef, poultry and fish division; a packaging division; and a tourism group.

Five years ago, Valores Industriales developed a hierarchical data base system with color graphics and 82 applications.

Planning for the corporate computer system began in early 1978, with a detailed analysis defining policies, user requirements, equipment configurations and performance objectives.

After evaluating several systems, the company narrowed it down to a choice between Digital Equipment Corp.'s Decsystem-2060 or IBM's 4341.

"The main criteria for selection were system cost, time-sharing capability, peripheral control, ability to interchange information and applications with other [Valores Industriales] computers, personnel training required and vendor support," commented Jose Luis Torres, DP planning manager for Valores.

"The price difference between the two systems was about $80,000 in favor of DEC," Torres said. "We finally selected the DEC system because of time-sharing capability, system simplicity and ease of operation."

The Decsystem-20 mainframe was installed in late 1978. The configuration consists of a Decsystem-2060, with 10M bytes of main memory, two 900 line/min printers and two TU77 tape transports.

Software for the system includes DEC's Tops-20 operating system, DBMS-20, APL, Fortran, Cobol, Basic and several graphics packages. The company also bought Sistemas de Informacion (Sisinf), a Spanish hierarchical data base procedural language from Kratos SA in Monterrey, Nuevo Leon, Mexico.

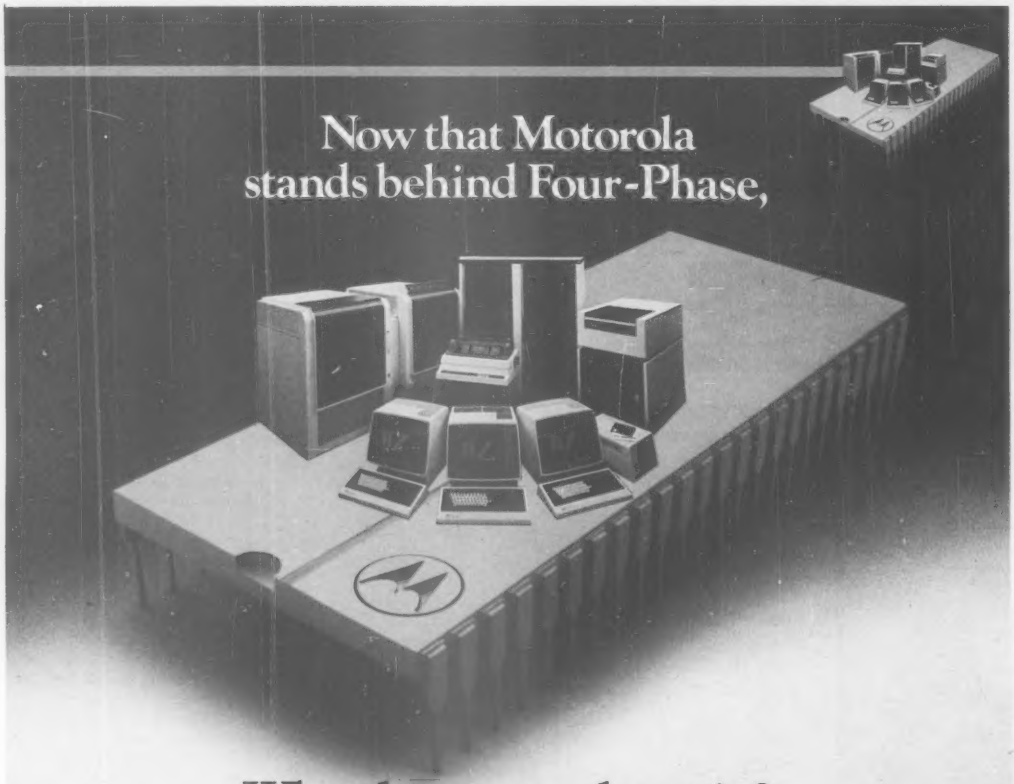
"Sisinf is an elegantly simple language, in Spanish, which is designed to improve productivity," noted Francisco Javier Martinez, Valores systems planning cocommands, such as Enter, Delete, Change, Display, Summarize and Cost Schedule, that are easy to learn and greatly simplify programming."

Sisinf Over Cobol

Martinez said he has observed a sevenfold increase in program development productivity and a tenfold increase in program maintenance using Sisinf over Cobol.

A large portion of the Decsystem-2060's data base is devoted to personnel records on Valores' 37,000 employees. Forty-two human and industrial relations applications are in effect with 18 more planned. For human resources planning, the applications include plant organizations, personnel balances, cost-of-living and wage analyses, labor forecasts, labor/social environment infrastructure, labor cost analyses and records of industrial accidents.

"We are quite pleased with the Decsystem-20," Torres said. "We started with a three-year plan and after just two [years], it was 95% complete. We have since undertaken additional tasks that we couldn't envision when we first started."



What do you stand to gain?

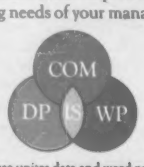
A way out of chaos.

We are in the midst of a revolution in the way we use information. The computer terminal has joined the telephone and the calculator as part of day-to-day business life.

It is a time of confusion. Everyone has some kind of "office automation" to sell, based on everything from word processing expertise to networking capability. It's all very confusing if your task is to plan your company's future, your responsibility to manage its resources wisely.

But, there is a way out: the solution made possible by the Four-Phase/Motorola alliance. The combination of resources and experience brought together by that union now makes it possible for you to work with a coherent, integrated, complete office automation system . . . Not just isolated functions.

Four-Phase has over a decade of experience in the creation of computer-based systems. We have pioneered in the distribution of computer functions and the design of computer networks that bring together your corporate computing facilities with the personal computing needs of your managers,



Four-Phase unites data and word processing with powerful communications capabilities to bring you complete information systems.

designers and engineers.

Motorola adds strong financial and management strength. It offers a host of complementary technologies and related subsidiaries whose efforts and expertise will now be joined with that of Four-Phase. And, not the least contribution is Motorola's powerful M68000 microprocessor that now becomes the nucleus to drive and bind together a growing family of Four-Phase office automation systems.

Put chaos behind you. If you would like to hear more about the rational, orderly – complete – Four-Phase/Motorola approach to office automation, write us on your letterhead, indicating your specific areas of interest. Four-Phase Systems, 10700 N. De/Anza Blvd., Cupertino, CA 95014.

MOTOROLA INC.
Information Systems Group

Four-Phase Systems
The Office Automation Company

Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc.
Motorola and Ⓜ are registered trademarks of Motorola, Inc.

SEE US AT BOOTH #5392, AT NCC IN ANAHEIM MAY 16-19

datapro 70

Still the EDP Buyers Bible

Our industry bears little resemblance to what it was 13 years ago when EDP system buyers, evaluators and vendors turned to **Datapro 70** to check what's new.

Datapro 70, too has steadily changed in pace with the information needs of the many thousands of EDP professionals who depend on us. Today's **Datapro 70** reports in depth on the newest and most important EDP products and services—those that are shaping our industry's future and offer today's users the greatest benefits.

As a result, **Datapro 70** and its companion services continue to be the undisputed "bibles" to which the most knowledgeable professionals turn when they need the **complete** facts about **what's new** in information processing.

And Datapro Research Corporation continues to grow and change—rapidly and successfully. For example, last year alone, **we increased our editorial/analyst staff by 35%**, just to track the faster changing EDP systems, products, and services; and to do so in greater depth than ever before. We recently installed the latest in **automated electronic publishing** systems. And in just the past 14 months we delivered **three major new information services** to the industry—on telecommunications, microcomputing, and on-line services.

As the information processing industry has grown and diversified, **Datapro 70** has spawned **19 other specific looseleaf subscription services**, each dedicated to comprehensive reporting on a given industry segment. This means **you can select** from Datapro just the information you need—and know you will have the best and most complete information available to help you evaluate, select and stay aware of the most important systems.

Whether your changing needs and interests are concentrated on microcomputing, office automation, data/telecommunications, mainframes or software, you'll find that Datapro, and Datapro alone, has **all** the answers you need to keep a competitive edge.

What's more, only Datapro offers you the flexibility of staying informed through **your choice of media**. Our series of 50 volumes of monthly looseleaf services is fully augmented by: • over 100 timely seminars (available at your site, or in over 16 convenient cities) • hands-on microcomputer workshops • technology conferences and management briefings • over 50 compact and inexpensive Feature Reports • 21 industry-specific monthly newsletters • our new emerging line of handbooks, guides and compact directories • contract publishing and research services • Nikkei-Datapro (our Japanese-language editions) and our European Editions which report on the world's EDP scene.

Our new state-of-the-art electronic publishing system is not only helping us to shorten our print schedule—it also means that users with unique information needs can now turn to Datapro for **electronic delivery** of selected information packages—another unique Datapro benefit.

As always, each Datapro service is available on a trial basis **without purchase obligation**. Since 1970 nearly a million information processing professionals have benefited from this trusted, convenient Datapro offer. To stay at the head of the pack, shouldn't **you** be checking today on what's new from Datapro? Simply call us toll free today at 800-257-9406, or return the coupon below.

☐ I'd like to review what's new from Datapro in the areas checked below. Please provide more information.

EDP SYSTEMS
- ☐ Datapro 70, the EDP Buyers Bible
- ☐ Datapro EDP Solutions
- ☐ Datapro Reports on Minicomputers
- ☐ Datapro Applications Software Solutions
- ☐ Datapro Directory of Software
- ☐ Seminar descriptions/dates

MICRO/MINI COMPUTERS
- ☐ Datapro Directory of Small Computers
- ☐ Datapro Directory of Microcomputer Software
- ☐ Datapro Management of Small Computers
- ☐ Who's Who in Microcomputing '83
- ☐ Seminar descriptions/dates

COMMUNICATIONS
- ☐ Datapro Reports on Telecommunications
- ☐ Datapro Reports on Data Communications
- ☐ Datapro Reports on Communication Solutions
- ☐ Datapro Directory of On-Line Services
- ☐ Seminar descriptions/dates

OFFICE AUTOMATION
- ☐ Datapro Reports on Office Systems
- ☐ Datapro Reports on Word Processing
- ☐ Datapro Reports on Copiers & Duplicators
- ☐ Datapro Automated Office Solutions
- ☐ Seminar descriptions/dates

INDUSTRY AUTOMATION
- ☐ Datapro Reports on Banking Automation
- ☐ Datapro Reports on Retail Automation

INTERNATIONAL EDITIONS
- ☐ Datapro 70
- ☐ Datapro Reports on Word Processing
- ☐ Datapro Reports on Minicomputers
- ☐ Nikkei Datapro EDP*
- ☐ Nikkei Datapro Office Automation*

When computer-minded people what to know what's new, they check with us.

Visit us at Booth S5010 at the NCC Show.

name

company

position

street

city

state zip

phone

information that leads to action

datapro

Datapro Research Corporation ☐ 1805 Underwood Blvd. ☐ Delran, NJ 08075 ☐ 609/764-0100 ☐ A McGraw-Hill Company

McGraw-Hill

Ability to Inspire People Cited

Speaker Lists Ingredients of Leadership, Success

CW Photo by M. Zientara

Terry W. Mullins

By Marguerite Zientara
CW Staff

BOSTON — Leadership is "the ability to inspire people to want to join you in a common purpose to achieve something special," and nowhere is it more valuable than in a business setting.

That was the word recently from Terry W. Mullins, associate professor of business administration at the University of North Carolina-Greensboro, speaking on "Leadership Through Motivation" at the annual conference of the Association for Systems Management.

"Individuals' purposes are incongruent with an organization's, and people behave in intermittent and individual ways," Mullins noted. Keeping employees motivated calls not only for leadership, but also supervision, a "necessary ingredient of, but not a substitute for, leadership," he said.

In excellent companies, managers "care greatly about what they do and do it with zeal," Mullins said. "Top management is rigid regarding what it considers important."

Recruit Carefully

Another ingredient of success is that "recruiting is handled extremely carefully," he noted. "You can help or hurt yourself in personnel selection more quickly than in any other area.

"If you select well and motivate and lead properly, an organization almost can't be beat," he added.

Worker performance is a function of two variables — motivation and ability — Mullins noted. "Ability is affected by training, while motivation is affected by supervision and leadership," he said.

Expectancy Models

Why do some workers produce more than others? "Employees use expectancy models to calculate the payoff of working hard or of coasting," Mullins said. First, they ask themselves, "Will effort on my part lead to high performance?" If the answer is no, they are not likely to try to perform.

Second, they ask themselves, "Do I have the knowledge and skills necessary for the tasks at hand?" If the work is carefully planned and they can go through and do it, workers are more likely to try.

Third, workers ask themselves, "Will performance lead to a reward?" and "Will the payoff be meaningful to me?" A manager "can't give a reward to someone unless that person regards it as a reward," Mullins pointed out. Possible rewards include additional pay, promotion, praise, new decor, business trips and time off.

Minimize Punishment

Managers should minimize punishment in the work environment, Mullins advised. "Punishment has a very devastating effect on people's productivity," he said. "If you use punishment, make it a fatal blow or don't use it at all."

There are also personal variables that enter into motivation, he added, such as the need for personal growth, competence, achievement, learning and for being regarded as responsible.

To have good direct supervision, one must set unmistakable goals, supervise the work more than the worker, distinguish between essential and nonessential rules and reward and punish sparingly.

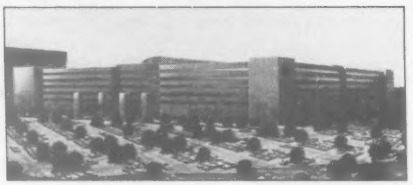
In addition, a manager must give credit where it is due; listen to complaints patiently, "but don't complain in return"; pay respect to the organization's values; protect subordinates; and retain control over expenditures and personnel actions.

A manager should also "innovate democratically" and "take infinite pains" to maintain a high level of performance.

Good indirect supervision calls for a manager to "find and hold the purse strings," develop detailed plans and projections, know what is going on at the lower levels of the organization, reorganize drastically or not at all and respect successful operations.

"A good leader knows success is built on previous mistakes and that people can't learn without making mistakes," Mullins pointed out. Good leaders also give help only when asked and create opportunities for successful experiences, he added.

THIS IS WHERE THE INDUSTRY IS GOING!



INFOMART should be the future address of anyone involved in the marketing of information processing products and services because **INFOMART** addresses itself to virtually every one of your marketing problems.

INFOMART brings the buyer and seller together in a central location specifically designed to help compress the buying cycle.

INFOMART educates and informs buyers of all levels through comprehensive, ongoing seminars and symposia designed to help them evaluate and purchase.

INFOMART is located in the most dynamic business center in the nation — DALLAS! A city whose accessibility, climate, airport and financial base make it the ideal trade environment.

INFOMART is an extension of a 30-year tradition. The Dallas Market Center, the largest, most successful merchandising complex of its kind, attracts over 500,000 buyers each year.

INFOMART is a cost efficient answer to the industry's most pressing problems — how to educate, exhibit, demonstrate and market your products at a reasonable, controlled cost.

For more information about **INFOMART**, contact Bill Winsor, Vice President/General Manager, 2100 Stemmons Freeway, Dallas, Texas 75207, (214) 655-6235. You'll not only learn who in the industry will be addressing at **INFOMART**, you'll also learn why.

THE INDUSTRY'S MARKET SUPPORT CENTER

INFOMART

Gives Away On-Site System

Supply House Opts for Off-Site DP Service

FAIRVIEW, N.J. — A plumbing supply wholesaler here automated its accounting and management procedures by going to an on-line, off-site service after encountering "two years of programming frustrations" with an in-house computer.

The Palermo Plumbing Supply Co. (PPSC) employs a staff of 59 in a showroom-oriented, two-location plumbing and warehouse operation. The company occupies building space of over 50,000 sq ft, has an inventory of about 15,000 different items and services more than 2,350 customers. As its business grew, PPSC decided to "get away from the 'Mom and Pop' candy store kind of accounting and management" and automate, according to Tom Palermo, its controller.

But PPSC was apprehensive about having its business records stored off-site. For that reason, the company opted for an in-house system, even though it had no DP experience. After researching various computer systems, PPSC installed an NCR Corp. 8200 minicomputer in 1979 to facilitate its cash flow and records management.

A year later, the only automated program in operation was accounts receivable; invoicing was still being handled manually. The software programmer, an independent contractor, was seldom available to write programs.

After a year and a half, the system generated only invoices and statements.

Two Different Businesses

"After we bought a computer, we ended up being in two businesses — the computer business and the plumbing supply business," Palermo said. Besides forcing the company to suffer through two years of "culture shock" with the "new disciplines" required by the computer, the system took too much time away from the primary business, he added.

In the end, PPSC learned an "expensive" lesson: "Never buy an on-site computer system that doesn't have proven programming that you can use immediately," Palermo said.

In the midst of these problems, in January 1981, PPSC received a call from Terminal Applications Group, Inc. (TAG) of Scarsdale, N.Y., developers of business-oriented applications programs for plumbing and heating supply and other wholesale inventory-oriented applications. TAG offered the option of renting, leasing or purchasing hardware and software; a five-year pricing guarantee; a Life-Line support staff that it claimed can resolve problems in less than three minutes; and free computer time.

Impressed by what it saw, PPSC contracted with TAG in June. "One of the joys of TAG," according to Palermo, "is that PPSC doesn't need an on-site computer — or have to deal with the equipment, personnel and downtime that go along with it."

Instead, PPSC has three workstations at its two locations functioning as an inquiry and retrieval system. Each TAG workstation is comprised of a desktop CRT display with keyboard, a high-speed printer and a modem link to TAG's NCR 8500 mainframe through regular telephone lines.

The workstation operators were trained in two days, Palermo said. Moreover, "within one month on TAG, we surpassed two years of our in-house computer system's output, successfully automating invoicing, pricing and statements and accounts receivable."

Real-Time Response

By October, TAG had PPSC's accounts payable and most of its general ledger on-line with real-time response to inquiries. "We are also able to determine which portion of our revenues are derived from parts, showroom sales, phone or mail orders," Palermo noted.

TAG adopted Plumlee's Pricing System in February 1982, which lists parts, styles, models, colors and pricing for various manufacturers' products in its data base.

"The TAG system has saved us a lot of money — compared to the NCR system — by eliminating the need for our developing and debugging a multitude of software programs; hiring programmers and additional personnel — despite a steady increase in business; and eliminating the need for nursing an expensive-to-buy-or-lease computer," Palmero said.

Happy with what it calls the computer alternative, PPSC did pack away its NCR 8200 — it donated it to the Paramus (N.J.) Catholic High School.

Nobody offers you a wider variety of computer printers and printer experience than Facit/Dataroyal ... all the way from low cost ($695 list) matrix printers, to sophisticated graphics and color matrix printers, to models that print variable size characters and bar codes, to "daisy wheels" and a multimode near letter-quality printer. Industry standard parallel and RS232C serial interfaces are available in all printers.

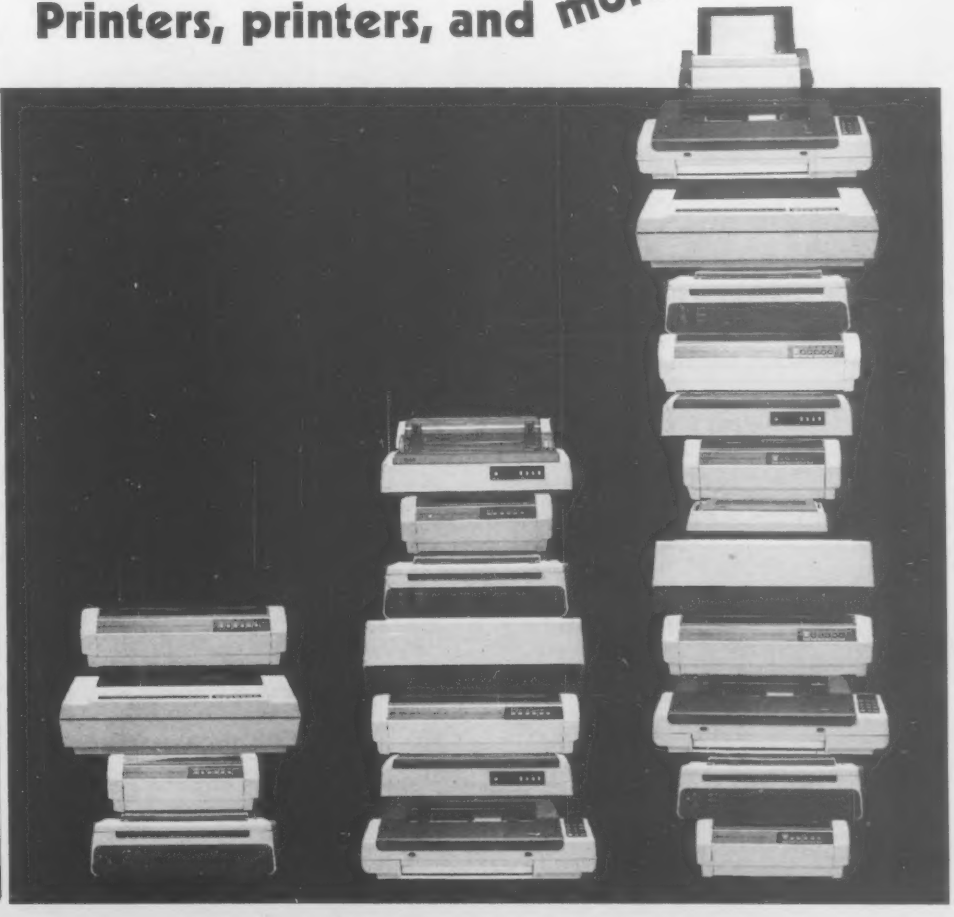
Our products are built to perform day after day in the most rugged environments. We achieve that kind of reliability by incorporating modern, trouble-free LSI circuitry, and fewer moving mechanical parts along with a high level of quality control.

Hundreds of computer systems manufacturers choose Facit/Dataroyal products with confidence, as do a great number of Fortune 500 companies who use Facit/Dataroyal peripherals with their systems.

If you want a trouble-free printer, contact your local computer printer dealer or Facit/Dataroyal, 235 Main Dunstable Road, P.O. Box 828, Nashua, NH 03061, (603) 883-4157.

FACIT DATAROYAL

Printers, printers, and more printers.



Urisa Conference to Focus On Decision Support Systems

ATLANTA — "Decision Support Systems for Policy and Management" is the theme of the Urban and Regional Information Systems Association (Urisa) 21st annual conference, slated to take place here Aug. 14-17.

The aim of this year's conference is to encourage agencies to share their experiences, observations and apprehensions in the use of computer technology in support of decision making at the federal, state and local levels, according to an Urisa spokesman.

The 40 scheduled sessions will focus on geographic information systems, public works, natural resources, finance and new technologies.

Preconference workshops will include: "Getting Started in Local Government Data Processing," "Computer Graphics in Local Government," "Microcomputers" and "Geoprocessing and Data Base Management," according to an Urisa spokesman.

Registration for this conference costs $190 for members and $240 for others.

Further details may be obtained from Urisa headquarters, which is located at Suite 506, 4720 Montgomery Lane, Bethesda, Md. 20814.

Package Helps Money Talk At U.S. Language School

PRINCETON, N.J. — Languages are not the only thing translated by the Berlitz School of Languages of America. Its DP department based here also has to translate financial data submitted by the school's 218 branches located in 22 countries in four continents.

In 1981, the school began looking for a financial package for its Hewlett-Packard Co. HP 3000 Series 3 minicomputer. One of the more unique requirements was that it should be able to perform currency conversions efficiently from the data that flowed into the DP department nightly from around the globe.

Robert Long, Berlitz's management information systems director, examined the market offerings, finding three or four financial packages tailored for the HP 3000. But one in particular, GL/Plus from McCormack & Dodge Corp., claimed to offer the currency translation capabilities Berlitz demanded, and that is the package Long bought.

"It's an excellent package that has met all our needs so far," Long said. "It is reasonably efficient from a processing standpoint, too."

Financial information is gathered from Berlitz's national and international sources using a store-and-forward communications link with RCA Global Communications, Inc., Long said. Each international entity prepares trial-balance and profit-and-loss statements in local currency, then transmits the statements to RCA's communications service. Berlitz then summons the statements with its HP 125 microcomputers, finally transferring them to the HP 3000.

Detail information from the international locations then follows the normal GL/Plus processing cycle through the acceptance and editing programs.

"Batches of local currency details by country are processed by the translation and validation programs of GL/Plus," Long explained. "Valid batches are accumulated in an accepted journals work file, while erroneous batches are sent to the error recycle file. At the end of the accepted journals program, we interrupt the job stream and hold the details on a work file. As the information comes in, the accountants do multiple repetitions of the accept or reject procedure."

Accurate Detail

The end result is accurate financial detail in local currency from all international sources ready to be posted to the GL/Plus master file. To facilitate the conversion process, Berlitz wrote a program to extract the local currency balances from the master file and feed them back through the GL translator, which uses a currency conversion factor allowing currency rates to be applied.

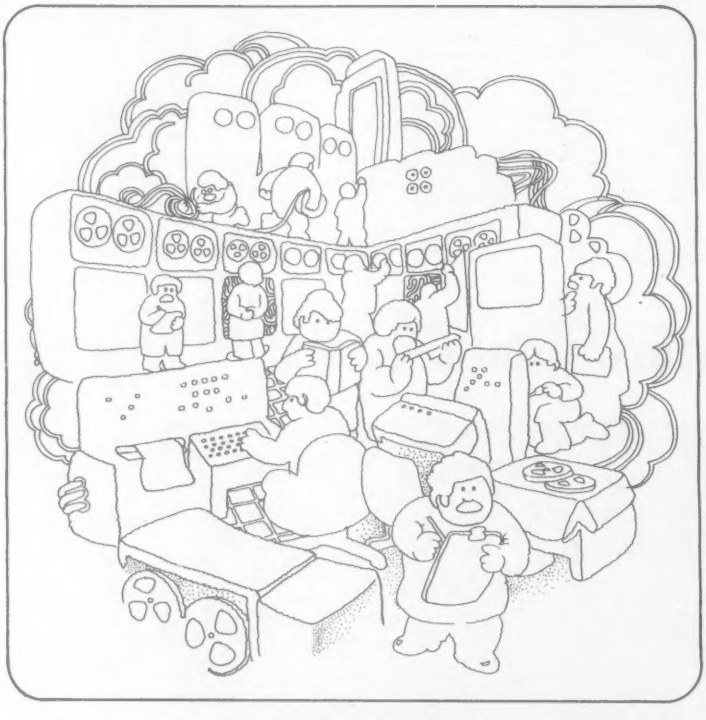
"Because we are extracting amounts from the master file, we are pretty sure everything will balance," Long said. "The job stream translates, extracts, validates, posts and reports consolidated results in U.S. dollars after three or four hours of processing."

Prior to closing the cycle, Berlitz runs a reversal cycle to zero out balance sheet totals and enter the previous month's year-to-date reversed balances of profit-and-loss accounts. This month's activity is entered as year-to-date balances, with the two entries producing the net current month activity, Long explained.

As for the future, Long said he foresees the expansion of Berlitz's automated financial systems to other countries.

Berlitz will further be using microcomputers in its individual schools for school accounting, all of which will require updating communications capabilities.

when programming is not enough . . .



You need *PRIDE®-asdm*

Ever imagine what would happen if we built bridges the same way that we build systems? We would probably become a nation of ferryboats. ☐ This is why the "PRIDE"-Automated Systems Design Methodology (ASDM) is based on engineering and manufacturing practices. *PRIDE®-asdm* is a totally integrated and automated approach for designing and building Information Systems. It provides the necessary insight for Systems Developers to perform their work in an orderly manner. They interact with the *PRIDE®-asdm* software to produce superior systems in a fraction of the time and cost that it would normally take with conventional manual methods. The nightmare of excessive forms and manuals is eliminated because all of the documentation resides on the computer in a reusable form. This advanced technology is available today on a wide range of computers. ☐ Build the right system the first time - with *PRIDE®-asdm*. Call or write today.

M B A

m. bryce & associates, inc.
1248 Springfield Pike • Cincinnati, Ohio 45215
TWX: 810-461-2691 (M B A WYOG) • TEL:(513)761-8400

Software for the Finest Computer — the Mind.

Develop, Apply, Chart Tariffs

Cargo Shipping Firm Stays Afloat With Micros

ELIZABETH, N.J. — How do you keep a worldwide cargo shipping firm afloat when it has vessels that visit more than 180 ports and cities in 56 countries? You use a fleet of microcomputers, of course, that keep track of the maritime comings and goings.

In all, Sea-Land Service, Inc. ships more than 650,000 container loads of cargo each year. Two years ago, the firm decided that a network of microcomputers could be used in conjunction with its IBM 3033 mainframe to cut costs and to speed up the processing of paperwork for regulatory agencies and the firm's international offices.

One of the most critical operations involved developing, publishing and applying ocean tariffs. According to the firm's manager of tariff and rating systems, Jeffrey W. LeRose, tariffs are documents that set the rates for point-to-point cargo movements. The tariffs also contain the rules and additional charges, if any, for moving cargo.

LeRose explained that tariffs can range in size from a few pages to better than 500 pages in length. The forms used to be typed on a typewriter, then photocopied and forwarded, either by mail or courier, to the Federal Maritime Commission (FMC) or the Interstate Commerce Commission (ICC) for filing, according to LeRose.

Decided to Automate

The manual system used by Sea-Land was getting expensive and complex. In light of the rising costs involved, LeRose said Sea-Land decided to automate the process.

Begun in 1980, the project was implemented in several phases. The first phase, LeRose explained, was to develop an automated system to prepare and file tariffs. The initial step was to install a word processing system. Sea-Land adopted a specialized tariff system developed by Computerized Shipping Services, Inc., based in Beaverton, Ore.

The original system consisted of of an Onyx Distribution, Inc. microcomputer that controlled eight Zenith Data Systems Corp. Z89 micros, each with two Printronix, Inc. printers. Computerized Shipping Services provided the FMC and ICC with printers and modems in Washington, D.C., to allow both organizations to receive tariff pages for filing, LeRose said.

The next phase was to automate the publication and distribution of the tariff pages. To do this, LeRose said, Sea-Land decided to tie the microcomputer network, located at the firm's corporate headquarters in Menlo Park, N.J., to the firm's host IBM mainframe in Elizabeth, N.J., about 15 miles away.

The microcomputer network was to be treated as an IBM 3271 control unit and was to send and receive transactions from the host 3033 processor via IBM's CICS. In order to tie these two systems together, LeRose explained, special software and a customized chip were designed.

Once data was available to the host, an on-line CICS tariff recipient system was developed to service those recipients needing hard copies of the tariffs. A Xerox Corp. Electronic Printing System was installed at the Menlo Park facility and linked to the 3033 host via a 56K-byte communications line, a Paradyne Corp. Pix communications system, LeRose explained.

This solved a big problem, LeRose continued. Not all tariff recipients got the same tariffs. And daily multiple mailings for the same recipient were often required. By using the host system recipient and distribution programs, hard-copy distributions of tariffs could be automatically sorted and directed to their correct recipients. And mailings were reduced to one per day, per recipient, according to LeRose.

By using a Xerox 8700 laser printer under program control, Sea-Land can produce graphics in various fonts. By programming conversion routines into the microcomputer network, Sea-Land made sure characters and graphics could be displayed and sent from one machine to another, LeRose said.

The Xerox 8700 is used to print both tariffs and a cover sheet that functions as a mailing label. The cover sheet is printed on a colored paper stock, while the tariff is printed on white paper.

The 3033 host processor sorts the electronic images so that, when printed, the tariff pages and cover sheets are produced as a complete package.

The package is then slipped into a window envelope for mailing. Since each recipient's tariff pages are color-separated, Sea-Land has been able to overcome distribution problems, LeRose said.

For locations that do not need a hard-copy version of the tariffs, Sea-Land installed about 1,000 IBM 3270-type CRT terminals. This allows the remote locations to have almost instant access to a tariff once it has been published, LeRose said.

The easiest way to put together a national service team.

One easy phone call can set you up with one of the largest, best qualified service teams in the nation. Western Union's Field Service. We have all the people and equipment you need to provide fast, reliable, high-technology service, coast to coast.

425 locations nationwide.

Wherever your customers are, we're nearby. That's one reason why our response time can be 33% faster than our competition's—we consistently average under four business hours. Restoral time is fast, too. Technicians can get most any part they need, quickly, from our computerized inventory system. And, in over 20% of all cases, a service call isn't necessary. We use our central computer to solve the problem by phone.

4,500 service experts.

From service coordinators to field technicians, our people are among the best trained in the business. They do things right the first time.

Our average technician has 16 years of experience.

And receives 20 days of training per year — up to twice the industry norm. That includes video training sessions to keep them on top of the latest technologies. So we can be ready to service your new products even before they hit the market.

From Apple to Xerox.

No matter who you are, we can be fully qualified to service your office communications or automation products. We have the expertise, the equipment and the people.

Find out how much our service team can do for your product. Call 201-934-0200 or Telex 642-474. Or send your business card to: Bill Thompson, President, Western Union Field Service Division, One Lake Street, Upper Saddle River, NJ 07458.

Western Union Field Service.

Nationwide, high-technology service.

Audiovisual Training Group Cuts Costs With WP System

WINDSOR, Conn. — Productivity went up and production costs came down — both by about 30% — following a move from typewriters and a centralized word processing system to an information system, according to David Pope, a manager here at the Power Systems Group of Combustion Engineering, Inc.

Pope's department of 47 engineers, writers and illustrators produce audiovisual training materials for use with their company's product line of steam generating equipment for electronic utilities and industrial plants. Churning out some 40,000 pages of training manuals a year, the department had been operating with the help of typewriters and the company's central word processing department.

The significant improvements in operations reportedly occurred in October of 1982 when the department installed a Xerox Corp. 8010 professional information system, Pope explained. "Being able to cut and paste and add graphics electronically are the major advantages of the Xerox system," Pope contended. "We expect to reduce our annual printing and word processing costs by $100,000, and we've done away with a very cumbersome and unproductive editorial process as well."

Pope said the typical training or maintenance manual runs three to five volumes long, and each volume might have as many as 700 pages. "Most jobs required seven document creation and revision steps, and each step took two weeks," he related. "Now, we've cut our turnaround time in half."

The Xerox system is comprised of seven Xerox 8010 professional workstations, an electronic file that stores 35,000 printed pages of information and a laser printer that stores and reproduces three families of type styles, Pope explained. The machines are linked together by a Xerox Ethernet local-area communications network.

The 8010 workstation has a desktop electronic display that accommodates up to two standard pages of information or a portion of as many as six pages to simplify copy revision and editing, Pope said. Symbols for familiar office objects, such as letters, file folders and in/out baskets, move copy blocks around and create graphics.

The system's interface is a hand-held mouse control that moves work on the screen from symbol to symbol in the electronic equivalent of retrieving paper from a filing cabinet and bringing it back to a desk for revision. All composition is accomplished on the screen, according to Pope, and so the printed page, including type choices and graphics, looks the same as the screen version.

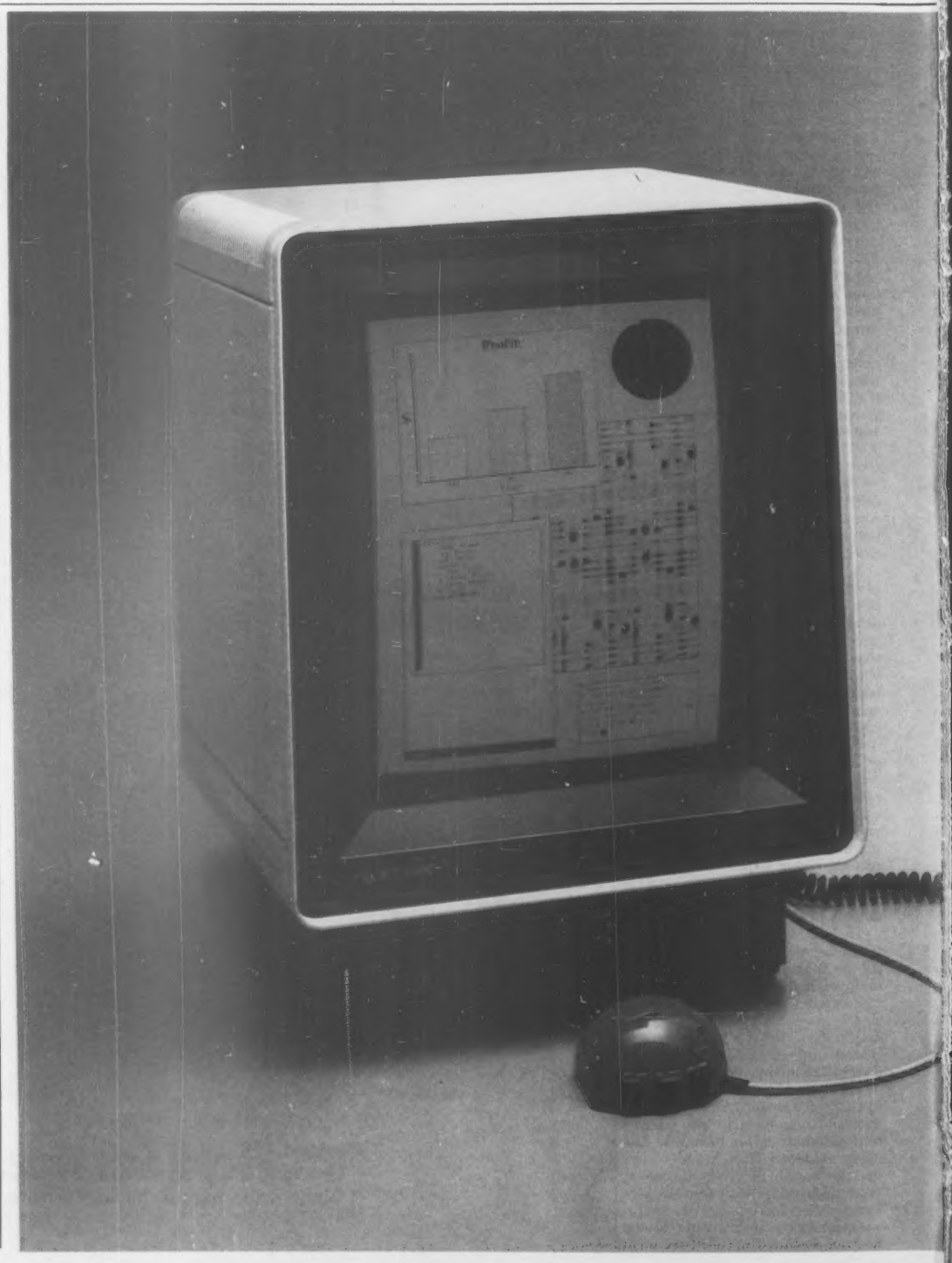
"Very few of our people in Training and Publications Services had any experience with computers or word processors," explained Ronald Lysik, Power Systems' manager of Systems Development Services. "Some of them can't even type. But they're all authors now, in a very different way from before."

Data Security Workshop Slated to Begin May 31

ORLANDO, Fla. — The International Association for Computer Systems Security, Inc. (IACSS) and Data Security Workshops, Inc. will hold their 55th International Operational Data Security Workshop here May 31.

The four-day workshop will include 19 sessions on topics such as the technical and administrative controls dealing with the security problems of distributed processing, computer facilities support, communications security, personnel controls, backup and recovery contingency planning, and logical and physical access controls of programs and data.

Registration for the workshop costs $775 for members; $825 for others, from IACSS at Six Swarthmore Lane, Dix Hills, N.Y. 11746.



Division Finds Own System Now Feasible

McHENRY, Ill. — Technological improvements and cost reductions in hardware and software have allowed the Gearmaster Division of Emerson Electric Co. to implement its own in-house computer system separate from the parent company.

"Cost-justification of a totally separate system has only recently been made feasible," explained John Bigelow, systems manager for Gearmaster. Prior to installation of its own system in April 1982, Gearmaster had a batch-oriented system tied into Emerson Motor Division in St. Louis.

Two Datapoint Corp. Model 3600 terminals were used for data entry into a 64K-byte Datapoint 5500 computer here; then the data was sent over telephone lines to St. Louis for number crunching, he explained.

"The limitations of the batch system were recognized by Emerson, and we were encouraged to seek alternate solutions," he recalled. Gearmaster manufactures linear actuators and gear motors mainly for the medical field.

Main Concern

The division's search for the right computer solution began in late 1981. Gearmaster's main concern was to find manufacturing software for inventory control. With IBM's Mapics software in mind, the firm looked at the IBM System/34 and System/38 and systems from Hewlett-Packard Co. and Burroughs Corp.

In investigating various systems, Bigelow pointed out, "We didn't want to reinvent the wheel. What we observed was that packages from Systems Management, Inc. (SMI) [of Rosemont, Ill.] seemed to follow closely to the way we ran our business as a straightforward manufacturing process."

After attending a manufacturing seminar at SMI the following February, Bigelow was "even more impressed," he said. SMI offered to do a test run on SMI equipment with Gearmaster data.

Gearmaster accepted the offer and supplied a representative portion of inventory and sales information. The test system was up and running in two weeks.

"Nothing needed to be modified within the SMI system," he said. "The programs were used as is, and we were able to do a 'live,' on-line demonstration for Gearmaster and Emerson management. Based on that, we were given the go-ahead."

Gearmaster purchased the IBM Series/1-based system in April 1982, but during the implementation period from April to December, it leased a Microdata Corp. Reality system that ran parallel with St. Louis for a control comparison.

Gearmaster now has its own 256K-byte Series/1 Model 4955 with eight IBM 3101 terminals and a 300 line/min IBM 4973 Model 2 printer. The Series/1 uses SMI's Pick operating system and SMI's proprietary RPL programming language.

The software currently being used is a combination of applications from SMI's integrated Manufacturing Control Systems and Business Control Programs. The manufacturing applications are bill of material, inventory control, requirements planning, on order and cost control.

The financial/accounting applications are inventory and purchase order. Gearmaster expects delivery of routings and work-in-process applications "within two weeks," Bigelow said.

The only modification made was one to allow multiple storage locations to be inventoried in the stockroom, Bigelow explained. "The reliability of the hardware and the usage of the software has been very good," he said. "We haven't had problems since we put it on the IBM hardware; the Series/1 just sits there like a refrigerator, purring."

There is no data processing staff at Gearmaster, only a data entry clerk who acts as overseer and performs file saves. "We got a plain vanilla system from SMI, so we get 100% support," Bigelow said. "We plan to keep the system as clean as we can for as long as we can."

INTRODUCING YOUR WINDOW TO THE FUTURE. The highly sophisticated 5620 asynchronous terminal is indicative of what you'll be working with in the future, as well as what you can expect from Teletype Corporation. It's a low-cost, dot-mapped, UNIX*-based terminal that offers a good value in switched or point-to-point private line environments.

What's most impressive about the 5620 is its unique capability to divide the display into multiple "windows" of varying sizes. Our electronic red "Mouse" lets you easily create and control the windows. And because the host views each window as a separate terminal, several functions can be in process on the 5620 at once. For example, a programmer can work on one program while one or more are compiling and the terminal is receiving and displaying electronic mail. You can also download the 5620, and run programs independent of the host.

While the 5620 is a programmer's dream, it's also a valuable business tool. It can be used to compare and contrast multiple business situations or cases simultaneously; to develop one case while one or more are being executed; or to examine two sets of files from more than one data base side by side.

You'll enjoy extremely high resolution no matter how much you put on the screen. The dot-mapped display boasts 100 dots per inch resolution on a 15 inch diagonal monitor. You can address a dot anywhere on the screen, which gives you full graphics capabilities. Line drawings and tracings can be made with the "Mouse."

Although the 5620 is complex, it's not difficult to operate. You can use the "Mouse" to control terminal functions through a series of user-friendly menus. There's also a full complement of ergonomic features like a low-profile keyboard that's light enough to rest in your lap, a high resolution screen with brightness control, and a special faceplate to reduce glare.

Of course, you can count on our established nationwide service organization for prompt service.

If you want to know what the future holds, take a look at our 5620. Its windows make it easy to see what's in store for Teletype Corporation and you.

*Trademark of Bell Telephone Laboratories

TELETYPE: VALUE SETS US APART.

Teletype Corporation. 5555 Touhy Ave., Dept. 3223-Y, Skokie, IL 60077. Tel. 1 800 323-1229, Extension 601. "Teletype" is a registered trademark and service mark of Teletype Corporation.

YOU MAY SKIP THIS NBI NEW PRODUCT AD.

BUT YOU CAN BET THE FOLKS AT IBM, DEC AND WANG WILL TAKE NOTE.

At NBI, we earned our reputation by making fine dedicated word processors. But recently, we announced a remarkable new series of products that makes it plain that *our* dedication goes far beyond dedicated word processing. NBI is now a full-line office automation company.

Some of the world's best word processors just got better.

We've redesigned and improved the products Datapro User Surveys have rated superior to IBM, Xerox, DEC and Wang. We call them the OASys 4000 Series.

For openers, the modular, sculptured keyboard is smaller and sleeker. It fits on a 19 inch surface, the size of a standard typing station. The video display tilts, rotates, and has a tinted and etched anti-glare 14-inch screen which displays 25 lines of text. Reversible black on white is standard, with amber/black or black/green screens optional—all adjustable for brightness and contrast.

NBI takes the "loneliness" out of personal computing.

The OASys 2000 is a shared system personal computer that can communicate with word processors and up to 100 other personal computers, including IBM's, as well as mainframe computers. Now, all your professional workers have access to NBI's superior word processing capabilities, and they can communicate throughout the office without physically exchanging diskettes.

The OASys 2000 eliminates the three most common shortcomings of standalone personal computers: isolation from other office devices, awkward storage and exchange of data and limited word processing capabilities.

Integration (the industry's most misused term) explained.

Integration is the thing every office automation ad promises, and no office automation company has really been able to deliver. Until now.

With NBI's new SYSTEM ONE Integrated Work Station, information from the data base, electronic spread sheet, equation or graphics application packages can co-exist within a given document and be displayed on the screen. What's more, what you see is what you get. What's on the screen is exactly what will appear on the printed page.

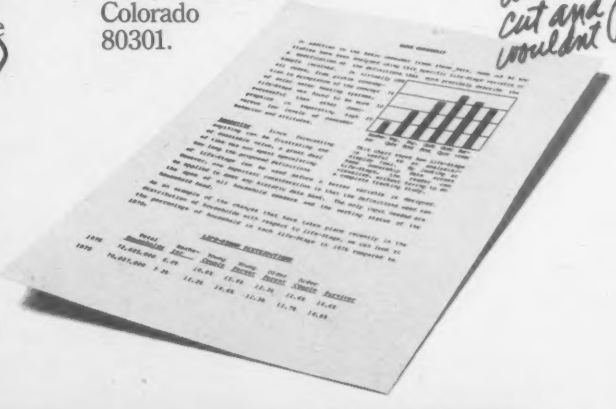
SYSTEM ONE is a powerful professional computer designed for the non-computer-literate business person, with a memory management unit that allows programs and data to be as large as 4 megabytes of memory per task.

And, of course, SYSTEM ONE gives you the superior word processing that NBI has always been known for.

SYSTEM ONE also offers...
chart graphics, electronic spread sheet, personal computing, calendaring, electronic mail and data base management.

For the first time, we have made it possible for personal computers and word processors to co-exist and interact *simply.* SYSTEM ONE models the work in your office, so you don't have to adapt it to the machine. In addition, we have designed our equipment to be compatible with other manufacturers' products.

It's a "good sense" approach
to the complex problems of office automation. To protect your investment in hardware and training, we've made it easy to upgrade at any time. We'd be pleased to discuss, in detail, any of the equipment or concepts presented here. To arrange an appointment, call toll free: 1-800-NBI-1234 or write us at P.O. Box 9001, Boulder, Colorado 80301.



NBI

© 1983 NBI, Inc.

Good sense. Best guide to the future.

Controller Regains Control With Report Generator

WINTER PARK, Fla. — With 14 retail stores each downloading point-of-sale (POS) data from terminals nightly, the controller's office at Shoemaker Bari of Florida here found itself beseiged with management requests for various reports when its IBM System/34 was installed 18 months ago.

And as more applications were implemented, management's clamoring for additional reports was often met by delays caused by implementation timetables or requirements for the in-house development of more software.

At the same time, many managers were involved in projects such as financial projections and budgeting, which produced heaps of paperwork involving hours of manual calculations.

So Richard Evans, Bari's controller, began searching for a software package that would be flexible enough to meet a range of growing requirements, simple enough to be implemented fast and reasonably priced.

Product Selection

After scanning the advertisements and product announcements in trade journals, Evans settled on Calc/34, licensed by Westmoreland Systems, Inc., also of Winter Park.

"The price was right, the package seemed to have the features we were looking for, and Westmoreland was right around the corner from us," Evans said, explaining his choice of Calc/34.

Within a week of installing the package, Evans, who had no programming experience, was able to complete his first model monthly sales worksheet, which computes sales tax payable, managers' bonuses payable for each of the 14 retail outlets and sales reported to each of the malls in which the company operates. The model, Evans said, now saves the company four man-hours per month.

He then developed a list of areas where the package could be used in place of manual reports and worksheets. "I was amazed how simple it was to build a model," Evans said. "It is basically a three-step approach involving naming the rows and columns of output desired, defining and listing the input items and writing the calculation statements in order to change the input values to the desired output results. All that is required to write a group of calculation statements comprising a model is the ability to think logically and use basic math."

Other Models

Evans followed his first model with two others designed to replace manual payroll and sales reports. He said the company saved about 20 man-hours in doing so and produced better quality reports than could have been achieved manually.

His fourth model was designed to provide management with a forecasting tool for decisions relating to new store openings, a model that would use management's estimates of key variables such as sales, profit, interest rates and turnover to arrive at various project possibilities.

"We found ourselves able to get the answers to 'what-if' questions that previously were unanswerable," Evans said. "It is now company policy to evaluate each new store using this model."

Other models developed at Bari using Calc/34 include a financial budgeting model and a markdown planning worksheet.

Evans now uses Version 4 of Calc/34, which costs $2,500. This latest release, he said, is more powerful and uses less CPU memory than its predecessors.

Directory Profiles Distributors Of Micro Software

WASHINGTON, D.C. — Software Research Co. has announced a directory for microcomputer software. "Micro Software Distributors: A Sourcebook for Publishers Seeking New Markets" contains profiles of 150 companies actively seeking programs for resale.

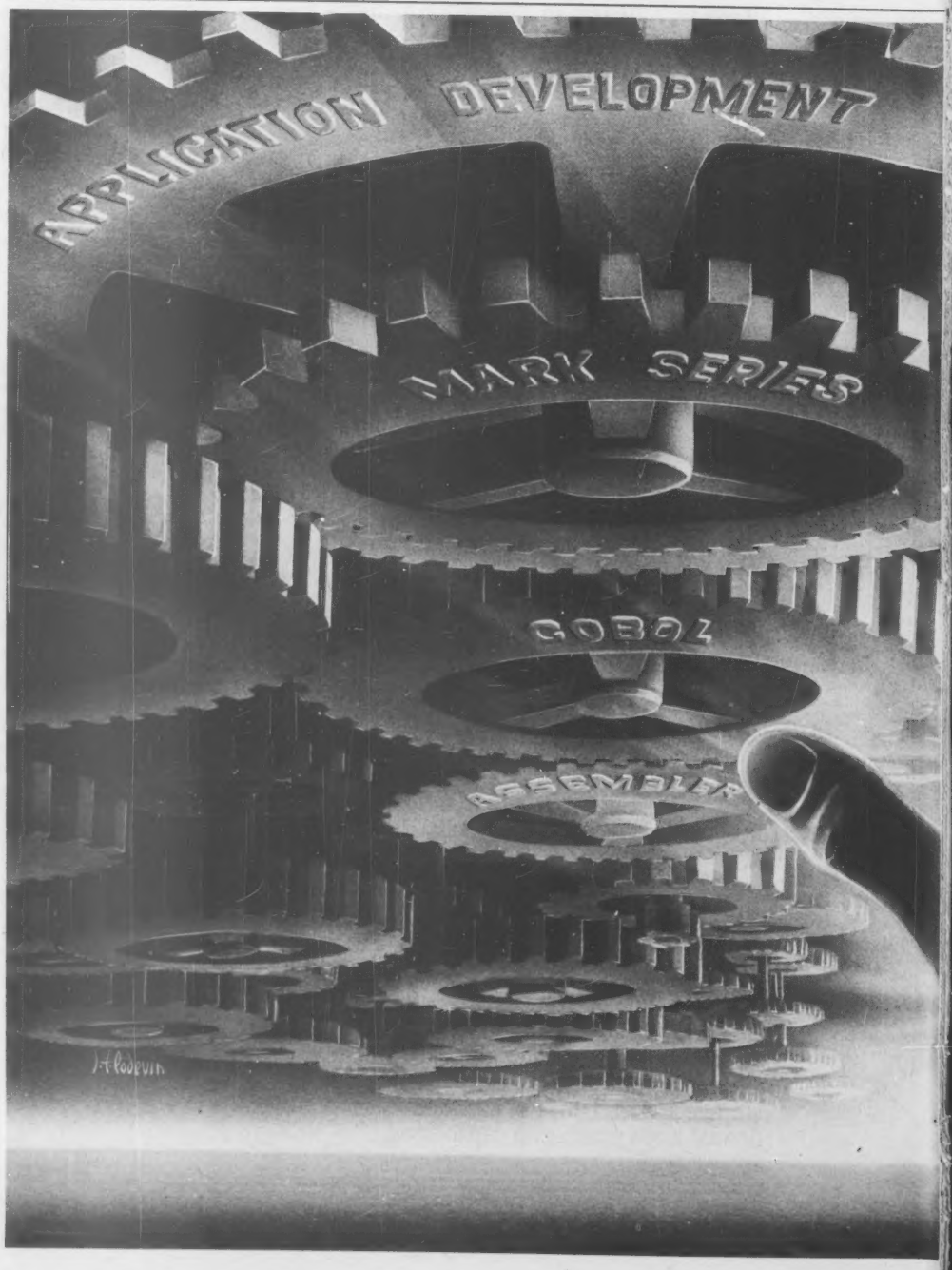
Included in the directory are hardware manufacturers, software houses, book publishers, hardware and software distributors and mail-order houses, according to a spokesman for the vendor.

Edited by Richard Loftin, a software marketing consultant and lawyer, the book features each distributor in a full-page listing that describes the company, the kinds of software it seeks, what it pays for software, the marketing right it obtains and how to submit a proposal.

For programmers who are not interested in becoming publishers, the directory identifies 100 organizations that publish software as well as distribute it, the vendor said.

Available in June, the directory is priced at $95.

More information about the publication is available from Software Research Co., Drawer 1, Box 9524, Washington, D.C. 20016.



Halfway to Paying for Itself

Western Union Expanding Terminal Network

UPPER SADDLE, N.J. — Dissatisfied with telephone and teletypewriter-based message service communications, Western Union, Inc. purchased a transaction processing computer system in 1980 that will pay for itself in under four years from labor savings and the prevention of duplicate money orders.

About one-fourth of Western Union's $907 million in 1981 revenues was generated from selling message services (including money orders, Mailgram messages and telegram messages), which are stored and switched by its Infomaster computer complex. Infomaster is split between two large sites, one in Middletown, Va., and the other in Bridgeton, Mo., each of which terminates approximately 3,000 lines.

Although Infomaster has been in service since 1972, Western Union's public offices and 8,500 public agents have used either teletypewriters or a telephone to transmit messages and money orders to Infomaster. In 1978, the common carrier decided to look into giving its public offices and large agents CRT terminals for communications, replacing the older model teletypewriters and equipping the telephone locations.

It began the process by first testing the concept using a Nonstop computer system from Tandem Computers, Inc. for its Mexican money order operation. This meant installing the terminals in Dallas, where money orders sent south of the border are collected.

Other Machines

Western Union did consider other manufacturers' machines. "We developed a matrix with a number of requirements," said Ira Clark, senior technical staff, systems engineering, at Western Union headquarters here. "Some major issues were fail-safe operation and program development."

Reliability and continuous availability are inherent in the Nonstop system, he said. Because it is designed for on-line transaction processing, it is a fault-tolerant system that continues running even if major components such as the processor, disk drives or memory modules fail, he said.

The two-processor Nonstop system located at the Infomaster site in Bridgeton enables Western Union operators in Dallas to verify money orders, convert them to Mexican telex protocols, transmit them and keep an audit trail on disk storage. It uses two 240M-byte mirrored disks and will pay for itself in under four years from labor savings and the prevention of duplicate money orders, Clark maintained.

"Before we installed the Tandem system, the Mexican money order operation was largely a manual process with room for error and duplicate transmission of money orders," he explained. "But the real cost savings came with software development," he added. He pointed out that money saved here would likely be saved again, in greater quantity, when it came time to create the software for the public office modernization.

Source Code

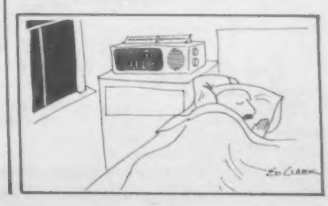
"We generated about 50,000 lines of source code in only six months for the Mexican money order system," he stated. "It's a fairly substantial amount for on-line programming. We were able to do it with the Tandem Pathway screen-oriented Cobol and Tandem's system language, TAL. It was only because of the Tandem-supplied software and development aids that we were able to implement that amount of source code in so short a time.

"We are in the process of installing an eight-processor Tandem Nonstop II system with approximately 500 terminals across the country," Clark observed. "We'll use 50 multidrop 4,800 bit/sec lines, each with about 12 terminals. We'll start by putting the money order business on the system, and later add the message traffic — Mailgrams and telegrams that come in over the counter."

The system will be used both to enter money order and message traffic into Infomaster and to deliver money order drafts to Western Union's check writers and messages to printers in the public offices and agencies.

The money order process will also be improved so that money orders are stored in a data base, rather than being transmitted directly to their destinations.

"We want to upgrade the service so that people can collect their money orders regardless of whether they can reach a particular office or agent," Clark said.



ENGINEERED SOFTWARE:
A DIFFERENT PERSPECTIVE
ON INCREASING PRODUCTIVITY.

Business is big on COBOL because it's safe, powerful, durable and very expensive to replace. Unfortunately, COBOL is not very big on productivity. The backlog, in fact, threatens to bring the fast-paced world of commerce to a grinding halt.

Fortunately, there is a new software series that does not necessarily require abandoning your COBOL investment.

The MARK Series.™

STRATEGICALLY ENGINEERED.

Strategic software isn't simply written. It's engineered with intensive research and hardnosed quality control. It means extensible architecture. And it means strict specifications for reliability and durability.

Each provided through a disciplined development process to protect your long-term investment.

The MARK Series features MARK V,® a new generation compiler which is our comprehensive complement to COBOL for online program development. It is neither a mere COBOL pre-compiler nor an inefficient interpretive program generator. It is specifically designed to track IBM's data base and data communications direction for data processing professionals interested in high productivity and efficiency.

Overall, the MARK Series is designed to increase programmer productivity by two-to-five times in the development of major applications and the maintenance of existing applications. And that's strategic.

COMPREHENSIVELY ENGINEERED AND MORE.

The basic Application Development Center increases productivity with generators for online and batch applications in all IBM mainframe environments. More advanced centers additionally require ad hoc inquiry reporting and extraction from production data bases; and distributed application generation and relational data base support.

The MARK Series is geared to satisfy both basic and advanced requirements of the Application Development Center. And that's comprehensive.

MARK Series is more than just a new generation of software. It's a whole new way to perceive productivity.

From the company that's been decreasing backlog and increasing productivity for over 20 years.

Informatics General Corporation, Software Products Group, 21050 Vanowen Street, Canoga Park, CA 91304, (213) 716-1616.

THE SOFTWARE ENGINEERS.

Informatics general corporation

Appointment System Cuts Doctor 'Downtime'

FOUNTAIN VALLEY, Calif. — By converting from a manual to an on-line appointment system, a health maintenance organization here has improved the quality of patient service and has reduced doctor "downtime."

"Waiting times for patients to get appointments were getting longer and longer, and the patients' patience was getting shorter and shorter," recalled John Kozlak, director of management information systems for Family Health Program, Inc. (FHP).

That was the situation three years ago when FHP — with 75,000 patient/members and seven medical centers — based its appointment-making operation on "a big lazy susan, about eight feet in diameter, that contained binders for each doctor's appointment schedule," according to Kozlak.

At that time, there were 12 workers who took an average of four to five minutes to make a patient's appointment by manually searching through the binders until they found a mutually agreeable time for each appointment. "We were putting the patients on hold and making them wait for an operator," Kozlak said, "and the waiting times were increasing."

Something had to be done, so a project team developed requirement definitions, and the group started looking around for a computerized system.

After studying Mumps support hardware from Digital Equipment Corp., Tandem Computers, Inc., Harris Corp. and Data General Corp., FHP chose software from Atlanta-based HBO and Co., written in Mumps for the DG C-350. The software was modified for FHP's needs.

After a month's stabilization of the hardware, the system became fully operational two years ago. With mirror-image C-350s located in Santa Ana, Calif., the primary CPU currently is multiplexed to more than 40 terminals and printers in FHP's seven medical centers in Los Angeles and Orange Counties.

With the new system, the number of appointment workers has been reduced to seven. In addition, the time needed to make each appointment has been cut to an average of one minute.

With automation, the appointment maker first calls up the basic data on each patient, including his primary care physician and health care center. The worker then consults the physician's electronic appointment calendar and gives the patient the first available date and time. The worker uses the system to confirm the patient's eligibility, home address and home and work telephone numbers.

Appointment makers at each of the seven medical centers can make and change appointments. Each afternoon, the system transmits to each medical center a printout of each physician's schedule and patients. This simplifies the work of medical records personnel, who pull the patient files prior to each appointment.

The system has several benefits besides time savings, according to Dr. Raymond Pingle, vice-president of medical and provider services.

"It provides greater flexibility in appointment making and rescheduling," he noted. "It also enables the patient to see the same doctor and minimizes mistakes in communications among doctors, patients and the scheduling desk," Pingle added.

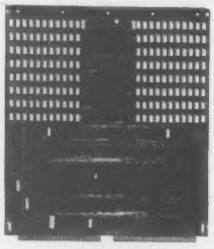
The system also ensures "less doctor downtime," he noted, because cancellations have a greater chance of being filled since most appointments are made on a first-available basis.

In addition, automation prevents patients from booking multiple appointments for the sake of convenience. Also valuable are the reports generated by the system.

Reports include appointment scheduler productivity data, patient flow data and information concerning the average wait for an appointment. The DG C-350s each have 512K bytes of main memory, two 6060 disk drives and a 45 in./sec tape drive.

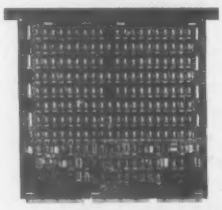
Memory Upgrades from EMC²

PRIME® users save $4,200



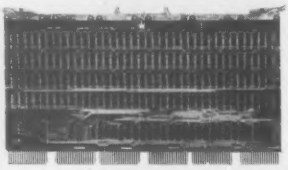
The PRIME Compatible E8 Memory Card with 1MByte Capacity, ECC, and Wide Word.

WANG® users save $3,100



The WANG VS-90 and VS-100 Memory Card with 1MByte Capacity and ECC.

digital VAX® users save $6,500



The VAX 730 and 750 VX Memory Card with 1MByte Capacity and ECC.

6 more reasons to choose EMC:

- Buy a pair, rent a spare for less than your monthly service cost
- Free loaner — Call to see if you qualify
- Trade in your old 256 KByte cards
- Delivery — From stock to 2 weeks
- 5 Year Warranty
- All memory cards have EMC's Comfort Switch to Enable/Disable each card

EMC²

EMC Corporation
385 Elliot St.
Newton, Ma. 02164
Tel: (617) 244-4740
TLX: 922531

® Registered Trademark of Prime Computer
® Registered Trademark of Wang Laboratories
® Registered Trademark of Digital Equipment Corporation

Decides to Go With One Vendor

Accounting Firm Standardizes WP Operations

By Bob Johnson
CW New York Bureau

NEW YORK — One of New York's Big Eight accounting firms had a big problem. It had nearly as many different kinds of word processing equipment as it had international offices.

In an effort to standardize systems to deal with what it called a "mill of paper work," Deloitte Haskins & Sells (DH&S) decided to bring in one vendor to meet its operating needs.

After conducting an in-house study of WP and what it would mean to the accounting operations of the firm, DH&S decided that a multimillion dollar purchase for a companywide extension and standardization of WP was in order.

"Once we decided that this was the way we wanted to go, we isolated a dozen of the major suppliers of such equipment," said Gerald G. Scherocman, manager of the firm's practice office systems.

"Then we held a vendors meeting and presented the attendees with our formal request for proposal (RFP). Nine of the 12 responded to the RFP and, from this number, we rather quickly narrowed the list to four suppliers," he continued.

Specific Needs Emphasized

Scherocman said that DH&S sat down with each vendor and emphasized the specifics of what the company needed.

"Aside from the standard WP capabilities," the manager explained, "we were very concerned with the equipment's ability to be upgraded. This upgrading would have to be accomplished with a minimum of further expense and effort; in other words, we didn't want to get into a companywide system that would be rendered all but obsolete by future technological developments. We wanted a system that would grow comfortably with the release of further technology."

Another consideration was the ability of the vendors to support and service adequately the firm's field sites or "practice offices." Scherocman also wanted to know how the vendors would handle support of other locations in the U.S., even though the equipment was bought out of the New York office.

The vendor of choice for DH&S was Wang Laboratories, Inc., which installed its OIS and VS systems throughout the accounting firm's worldwide network of branch offices. Scherocman said that 71 OIS systems are currently installed domestically; by the time the implementation is complete, about 100 U.S. offices will be using the WP systems.

"We have even begun to install systems outside of the U.S. as well, in places such as South America, South Africa, Australia and the UK," Scherocman noted.

Although the company finally selected a vendor it felt would meet its needs, the selection process was not an easy one, according to Scherocman. The manager said that some very "penetrating" questions had to be asked about the vendor companies, such as "the line of succession."

"Other companies may not be this concerned about selecting a vendor, but there was a lot of money and a significant commitment at stake. We didn't want to leave one stone unturned."

In the upending of stones, the DH&S WP search team discovered that it was in for some surprises. The four finalist vendors were asked to tell in detail how they would handle a service problem at a remote location. Scherocman recalled some interesting answers.

"One supplier admitted outright that it couldn't handle our smaller offices with the type of service we expected. Another supplier had the ability to service most of our offices, large and small, but it couldn't give us the shared-access system that we decided would be better than standalone units."

The manager went on to say that he was really shocked when another vendor said that it would sell DH&S a "repair kit" for each office so each operator could fix an equipment problem herself. If she had a problem she could call a special 800 number and the vendor would talk her through the repair.

Major points such as system upgrading with a minimum amount of effort and expense, service and support and ease of learning convinced DH&S after a personal meeting with Wang that it was most suited for the job, Scherocman said.

Considering ease of use, Scherocman maintained that because "scarce" WP professionals did not have to be hired for the systems and that a drop in demand for administrative help is predicted, the system will meet the company's plan for a complete payout in two years' time.

Although the company primarily uses its system for WP and list maintenance, Scherocman said that studies are under way to integrate WP with a mainframe computer for distributed processing capabilities.

North Star solutions are simple and powerful.

Not everyone needs a small business computer as powerful and fully-featured as a North Star. The North Star ADVANTAGE and HORIZON® microcomputer systems are built for those who demand a great deal more...of themselves as well as the vital tools they select for office automation.

Powerful

Putting a North Star system through its paces is like high-speed driving in a luxury sports car: instant response to user commands, with a feeling of untapped resources within. Your North Star system has the power to get you through the fast curves of business and over towering peaks in workload. North Star outperforms the industry in single-user, multi-user and now in office network systems.

Simple

Advanced software engineering has harnessed the power of the HORIZON and ADVANTAGE, so that achieving your results is as simple as a Sunday drive. Concise user commands instruct the computer to work the way you want it to.

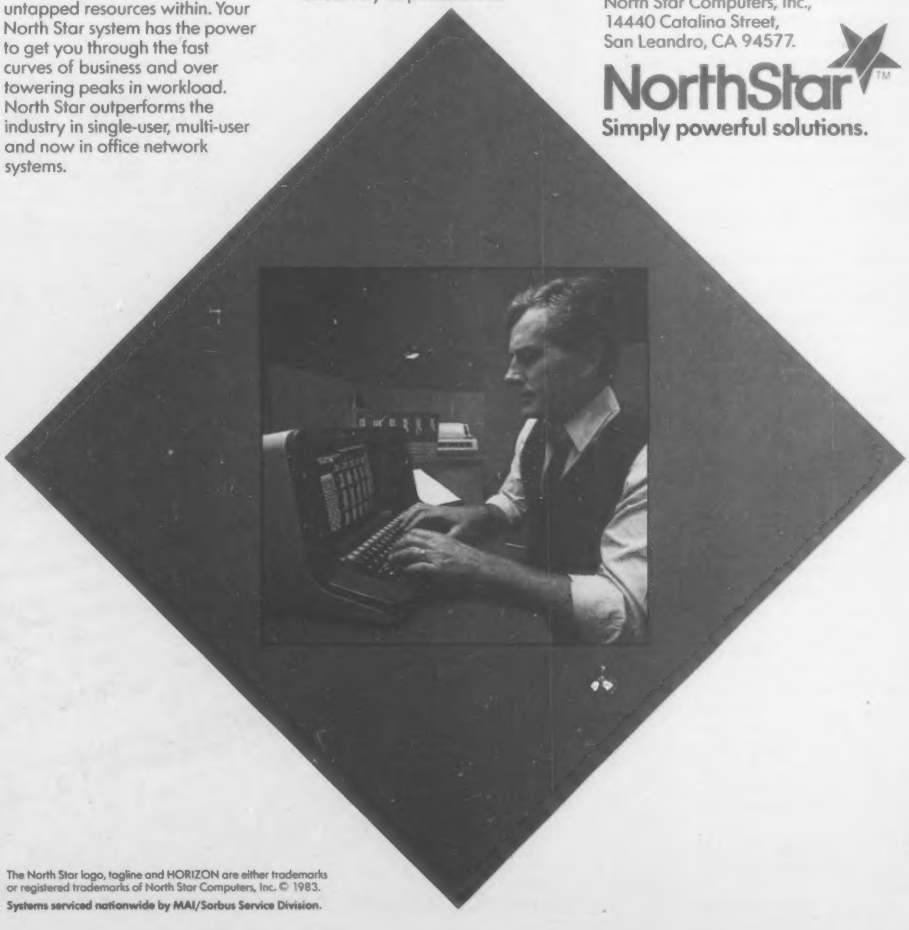
And, we keep it simple everywhere: service, system expansion, and even custom software.

Solutions

North Star systems are designed to get you from A to B as effectively as possible. The designed-in harmony of our word processing, planning, accounting and other applications permits faster solutions and a broader range of possible accomplishments.

And no solution is complete until it is in presentation form. North Star graphics concisely present your results in charts, graphs and graphic figures.

Discover North Star's simply powerful solutions at one of over 1000 computer stores or systems houses. Call 800-447-4700 for the location nearest you, or write North Star Computers, Inc., 14440 Catalina Street, San Leandro, CA 94577.



NorthStar™
Simply powerful solutions.

The North Star logo, tagline and HORIZON are either trademarks or registered trademarks of North Star Computers, Inc. © 1983.
Systems serviced nationwide by MAI/Sorbus Service Division.

Plastics Firm Automates Job Quotation Process

HAMPTON, N.H. — With a computer acting as both teacher and processor, nontechnicians at a plastics manufacturer here have automated the firm's job quotation procedures.

Complex, Inc., which manufactures extruded plastic disposables such as intravenous tubes used in hospitals, employs approximately 50 people and produces over 20 million feet of tubing annually.

Established in 1981, the firm soon recognized its need for a computer system that could adapt to its rapidly changing requirements.

According to President Robert Hunter, the company wanted to automate its job quotation procedure, which involved "a complex set of calculations based on customer order variables such as materials used, extrusion rates and quantity desired."

Until that time, this process was accomplished by hand, usually by Hunter himself. An automated job quotation program would relieve Hunter of this tedious task and enable any employee to respond to requests for price quotation over the telephone.

'The Perfect Fit'

As Complex began discussions with computer vendors, it became obvious to Hunter that while his options were many, he was hard-pressed to find "the perfect fit."

Also, the integration of an automated job estimation program with future programs was a major consideration.

When Complex was introduced to the Computer-Aided Programming for Computer-Aided Business (CAP/CAB) concept of Unidata Systems, Inc.'s 3000 small business system, Hunter felt positive his company was "on the right track."

The system, which features Unisyn, the vendor's applications generator, is said to enable users to do their own programming with the aid of a computer acting as tutor and coach as well as intelligent processor.

Because Unidata's applications generator is embedded with a knowledge of the life cycle of business forms, programming is reduced to no more difficult a task than answering pertinent prompts relating to the format of existing business forms and to making decisions when requested to do so by the CAP/CAB software, Hunter explained.

In the summer of 1982, Hunter purchased the Unidata system.

"Complex got more than it expected when the process of automating the job estimating procedure started. Not only was the computational procedure totally programmed and debugged in less than five hours, but the company also ended up with a comprehensive data base on which all of our future needs, such as inventory control and order entry, could be based," Hunter said.

Were there any problems? "Initially, the company experienced some minor procedural problems, such as not considering every possibility which had to be considered before the cost of an item could be computed.

"But once that oversight was recognized, the company adjusted its procedure and solved the problem in a matter of minutes," Hunter claimed.

As hard as it is for Hunter to believe that a nonprogrammer like himself would be able to outperform an experienced programmer, it has been true in this case.

"Everyday, Complex employees produce computerized quotations for extruded plastic tubing, having automated the entire procedure without professional assistance and a minimum of disruption," Hunter asserted.

" 'Almost like magic' was our reaction when our first computer program ran successfully.

"It wasn't that we were overwhelmed by the mysterious, superfast calculating machine, but that our complicated job estimating procedure had been automated, without the use of existing software or custom programming, in just five hours," he concluded.

Report Rates IBM 4300, 30

CHERRY HILL, N.J. — The IBM 4300 and 30 series processor lines have been evaluated in a study titled "Datacomm & Distributed Processing Report," published here by Management Information Corp. (MIC).

The report analyzes the nine models that comprise the IBM 4300 series, ranging from the 1M-byte 4321 Model Group 2 to the 16.8M-byte 4341 Model Group 12, as well as the 3030 and 3080 lines, which consist of 14 models with up to 67.2M bytes of memory and up to 2G bytes in virtual memory. Each model in these respective series is broken down according to performance, memory capacity and components.

The report is available for $49.50 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

System Switch Cuts Costs, Time For Hospital/Asthma Center

DENVER — When the National Jewish Hospital/National Asthma Center decided to switch from its Four Phase Computer Systems, Inc. key-to-disk minicomputer system to an on-line data entry system, it did not have to look far for a system to save both time and money.

The 140-bed hospital, which has an international reputation as a leader in treating and researching respiratory diseases and disorders of the immunity system, had been using Phoenix Computer Corp.'s Condor on-line program development software system on its IBM 4341 system since March 1980.

When the vendor came out with its Falcon on-line data entry software last summer, the hospital was immediately interested.

"Condor worked well for us," commented systems programmer Fred Learman. "We had faith that another product from Phoenix would be of the same quality."

The director of the computer resource center at the hospital, Jim Harbin, agreed: "The choice was obvious because we had Condor and knew that product was good."

Hardware Costs Cut

Besides the convenience of being able to enter all hospital data on one IBM 3270 keyboard, which Learman estimates saves the operators about 10% of their time, hospital administrators have discovered other benefits integral to the Falcon system. Harbin estimates the new system is saving the hospital about $1,200 per month in Four Phase hardware costs alone.

"Another benefit to me is that I can now turn the format programming over to my regular programming staff," he continued.

"Before, I had to have a specialized person who could program the key-to-disk system. This saves me money in personnel costs," Harbin explained.

Instead of hiring a programmer for about $17,000 per year, Harbin said he can make do with an operator for roughly $5,000 less.

Vulnerability Decreased

Learman pointed out that the system has also alleviated the problem of having only one person familiar with Four Phase programming.

"The department was very vulnerable when one specific individual had to be involved in every new or changing data entry function," he said.

"As far as convenience," he continued, "Falcon has saved us quite a bit in terms of operators. They had to deal with nightly backups on the Four Phase as well as on the mainframe. Falcon saved them about two hours a night."

Learman added that Falcon has resulted in improvements in cases of system failure as well.

"Now, if something goes wrong, I can get to it from the terminal in my office. Before, whenever there was a problem, I had to find an available Four Phase terminal, which often meant one in another building a quarter of a mile away," he explained.

Brand new terminal.

Same old story.

If you're looking for the best terminal value, look to a familiar name: TeleVideo. The story of our new 924 is the same story you've heard for the last four years. We've combined the best innovations in technology, design, and quality manufacturing to give you everything you want in an advanced terminal. And we've done it at a price that can't be beaten.

The 924 is comfortable, with a tilt and swivel non-glare screen. Its lightweight, low profile keyboard fits your fingers naturally. Our 32 programmable, non-volatile function keys turn often used instructions into simple one-button commands. The 924 provides extra display features, including full screen editing, character and block graphics, definable scrolling regions for multiple window operation, plus 32 character-by-character visual attributes.

The 924 has the intelligence you need too, with logical attributes to define protected and unprotected regions. And, with standard one page or optional four page memory, there's plenty of room to work.

If you don't need all the power of the 924, try our 915. It has all the design advantages of the 924, and is the superior terminal in its class. It just costs less.

The 924 and 915 mark a great new chapter in the TeleVideo story. And, like all TeleVideo terminals, they're reliable performers, backed nationwide by General Electric Instrumentation and Computer Service Centers. Contact us today about the 924 and 915 story and you'll enjoy the happy ending. Call 800-538-8725 (in California call (408) 745-7760), or send us this coupon.

TeleVideo Systems, Inc.
Dept. _____
1170 Morse Avenue, Sunnyvale, CA 94086

Yes, I'd like to know more about TeleVideo's new 924 and 915 terminals.

Name _____
Address _____
City _____
State _____ Zip _____
Telephone (_____) _____

208U

Santa Ana/California, 714-557-6095
Sunnyvale/California, 408-745-7760
Atlanta/Georgia, 404-399-6464
Dallas/Texas, 214-980-9978
Chicago/Illinois, 312-351-9350
Boston/Massachusetts, 617-668-6891
New Jersey/New York, 201-267-8805
Woking, Surrey/United Kingdom, 44-9905-6464

TeleVideo Systems, Inc.

Breeder Finds System Makes Horse Sense

KERRVILLE, Texas — Since it began operations in 1979, Shelton Ranches here has believed that it makes good horse sense to use its computer resources, in addition to instinct, in raising prize quarter horses.

For one reason, horse breeding is big business in these parts. At an annual sale last fall, 89 Shelton ponies fetched $882,000.

So when Shelton started breeding horses, it bought an IBM System/32, which it replaced within two years with a System/34. And recently Shelton replaced the System/34 with a System/38, continually expanding its breeding operations with the increased use of its data processing resources, according to Ed Schroeck, Shelton's DP manager.

Schroeck said the decision to go with IBM initially, and thereafter for upgrades, was based on a consultant's recommendation. Schroeck said, "Together with the consultant, we felt IBM was the main vendor in the marketplace. They have the service we want."

Today, Shelton's System/38 supports nine CRT terminal users, a 500M-byte 3370 disk drive and an IBM 3262 600 line/min printer.

Proprietary software was developed in-house with the aid of SPI Software Co. in Houston. The main package written, Equine Management Information System, was recently granted a copyright, Schroeck said, and Shelton now has plans to market the management package.

"It seems we're always finding a new way to do things here with the computer, or better ways of doing the same," Schroeck said.

For example, the system keeps detailed medical and breeding records on Shelton's 300 mares. Before the system was fully operational, Shelton workers had to use a card file, manually sorting through the cards to record what had been done each day to each horse, then determining what needed to be done the following day.

Now, Shelton's veterinarians feed that information into a terminal in the breeding barn. The system produces a report of the day's activities and also keeps track of where each horse is physically located, be it in the barn, pasture or paddock. Each veterinarian thus saves some four hours of work each day compared with doing the same jobs manually, Schroeck said.

The system also allows any of the veterinarians to take a vacation without worrying about adequate coverage, as any qualified veterinarian can access the system in an emergency, he said.

When a new horse arrives at the ranch, all pertinent breeding information is fed into the system, including its ancestry, marking and previous medical history. This information can be recalled by using a horse's name or its registration number. Also included in the horse's personal file are vaccination and shoeing schedules and other medical treatments.

On the business side, the system stores account information, completing billing documentation for horses' owners. Lastly, the system aids in breeding healthy, salable animals by carefully tracking the most opportune times to attempt artificial insemination, Schroeck said.

What to look for in a word processing printer.

And what to look out for.

First of all, look for a daisywheel printer. Daisywheels produce crisp, sharp characters that readers can't tell from the finest office typewriter.

They're the best choice for printing letters, proposals, contracts and other important documents that call for a professional look.

We make the DP-55 and DP-35 daisywheels, which print at 55 and 35 characters per second (CPS).

Rule of thumb: Faster is better.

Our DP-55 will print a one-page letter in about a minute. A 12 CPS machine takes five.

You may be happy to wait five minutes for your letter. But remember, while the computer is tied up running the printer, it may not be available for other jobs.

Bad design can make a smart operator look dumb.

People with otherwise normal dexterity sometimes become all thumbs around a computer printer. The fault is usually the machine's.

Our DP-Series printers were designed with the operator in mind. A status display is standard on the DP-55. The printhead mechanism tilts a full 90° to make printwheel changes a snap.

Industry standard ribbons and plastic or metal printwheels are available from Dataproducts or local office supply stores. More than a hundred type styles are available, so you can match most any office typewriter.

A printer's no better than the technology behind it.

Some companies are pushing the limits of their technical knowhow and offer little more than souped up typewriters. Dataproducts has decades of experience in the design and manufacture of sophisticated, high-speed computer printers.

Our daisywheel printers are serious business machines, engineered to perform reliably for years and years. And to provide their users the greatest productivity at the lowest cost of ownership.

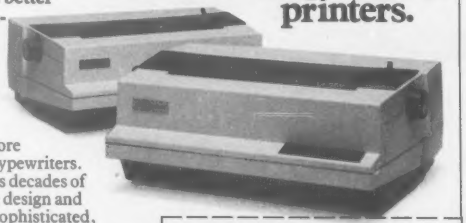
Depend on the world leader.

Virtually every major computer manufacturer buys printers from Dataproducts, then resells them with their name on them. For them, Dataproducts is synonymous with quality and reliability.

It's that reputation that made us the largest independent manufacturer of computer printers in the world.

To learn more about Dataproducts DP-55 and DP-35, or for the name of our distributor in your area, call (213) 887-3924. Or send the coupon below.

Look for Dataproducts printers.



Dataproducts Corporation,
6200 Canoga Ave., Woodland Hills, CA 91365
☐ Send details on Dataproducts' daisywheels.
☐ I'm shopping for printers now. Send a rep.

Name _____
Title _____
Company _____
Type of business _____
No. of printers needed _____
Address _____
City _____ State _____ Zip _____
Telephone _____ Ext _____

Send information on: ☐ 120-200 LPM matrix printers ☐ 300-1100 LPM band printers ☐ 1500-2000 LPM high performance printers ☐ Dot matrix graphics and label printers ☐ Printer supplies

Dataproducts is a registered trademark. DP-55 and DP-35 are trademarks of Dataproducts Corporation.

DATAPRODUCTS
The Printer Company

Micros Focus Of MIS Meet Set for Oct. 24

NEW YORK — "MIS: The Micro Link" is the theme of the third annual Conference on Management Information Systems (MIS), which will be held here Oct. 24-25 by the Center for Management of Baruch College.

Four major topics will be covered: executive systems, centralization vs. decentralization of DP, decision support systems and micros and office automation.

Sessions will be directed toward DP and non-DP managers who are using and planning for the use of microcomputers as a management tool. Attendees can expect to obtain information on specific applications and become familiar with the benefits and pitfalls of widespread use of micros in the total MIS picture, according to a spokesman.

The registration fee is $145. The Center for Management of Baruch College can be reached at 17 Lexington Ave., Box 520, New York, N.Y 10010.

Reference Set Covers Software

ESTILL SPRINGS, Tenn. — Associated Technology is offering a four-volume reference set that was designed to serve as a software management tool for establishing a company's internal programming and documentation practices.

Three of the volumes cover standard methods for programming in Cobol, Fortran and Basic. The fourth covers software documentation practices.

The set costs $45 through ATC Books, Rt. 2, Box 448, Estill Springs, Tenn. 37330.

Service Bureau Ties Turnkeys to Mainframe; Productivity Jumps 33%

MIDDLEBERG HEIGHTS, Ohio — An independent service bureau increased its job-processing productivity by at least 33% and trimmed business costs with the aid of a mainframe.

Ctrac Computer Services, based in the Cleveland metropolitan area, installed a Nixdorf Computer Corp. 8890 mainframe computer to handle clients' business inventory management projects. The mainframe acts as a central batch processing system and also as an interactive host — processing inventory data entered by clients on Ctrac's Minitrac turnkey business minicomputers. These small local systems are on-line, shuttling information between the mainframe and the client site.

Ctrac officials said that the 8890, which replaced an aging IBM 360/50 batch processor, has not only enabled the high-speed link to the clients' Minitrac systems, but also has helped the service bureau process more client work per shift. This extra performance allowed Ctrac to reduce its number of operating shifts, subsequently trimming power consumption, maintenance fees and other system costs. The company also said the Nixdorf system helps it use its programmers' time more effectively.

Ctrac Offerings

David K. Hamister, president of Ctrac, said Ctrac supplies business clients with computer services, tools and education that can help them closely monitor inventories, thus minimizing control and the purchasing uncertainties that commonly plague companies facing random customer demand.

Ctrac offers customers their own inventory control software systems and teaches them how to use this computerized recordkeeping process to phase in stocking items, automatically replenish them and efficiently phase out discontinued parts and products.

The client can use forecasting logic built into Ctrac software to establish basic inventory policy rules governing when to stock items, how much to keep on hand and when to drop an item.

Order Rules

Order rules in the system help clients specify when and how to restock or discontinue items based on standard stocking/nonstocking policy, seasonal or trend demand, automatic phase-in/phase-out/delete programs and other factors. Inventory managers can fine tune the system order rules with modifiers for lead time, set, ceiling and package quantities.

Management closely monitors the effect of stocking policies and purchasing decisions by reviewing Ctrac-supplied reports.

Periodically, customers update their inventory records by sending transaction data to Ctrac for batch processing, usually via dial-up telephone data transmission. As an alternative, Ctrac can accept inventory posting forms, mailed or delivered by the client, for data entry to disk and eventual output to punched cards, magnetic tape or diskettes. Processing is done over weekends, so the client receives reports and data by Monday morning of the next business week.

Turnkey Minis

Ctrac also sells, installs and supports Data General Corp.-based turnkey minicomputer business systems for clients who want on-site processing capabilities for order entry, invoicing, accounts payable/receivable, general ledger, payroll and other specialized business applications.

For interactive inventory control service, these independent systems can be linked to the Nixdorf mainframe for data entry, processing and return transmission.

Ctrac's inventory management services were designed to handle durable goods, service parts and industrial supply inventory.

The 10-year-old company has grown rapidly. Executive Vice-President David J. Normant recalled, "Only four years ago, we had 20 employees. Today, we have a staff of 30 salaried people and a total payroll of 135 persons. Our annual sales are about $3 million."

However, to keep pace with this organizational growth, increased customer demand for inventory management service and processing speed and other business pressures, Ctrac has periodically upgraded its computer system hardware.

Three Requirements

When Ctrac decided in December 1981 to replace its 20-year-old IBM 360/50 mainframe, company officials began a selection process primarily based on three requirements: processing performance, purchase/operating economy and IBM plug-compatibility.

At first, Ctrac primarily supplied batch inventory control services for small businesses. The service bureau used Sycor, Inc. Model 440 equipment for data entry and an on-site IBM 360/50 using Edos operating software.

"We only used the 440 for six months because it was too slow," Normant reported. "During our research for a replacement, we found that Entrex [now part of Nixdorf Computers] made the best data entry system then available — easy to use, very fast and able to support additional terminals without sacrificing performance," he added.

Ctrac quickly added those terminals. Two months after installing a Nixdorf Entrex 280 with four data entry stations, it upgraded to a Nixdorf Entrex 380 system with 12 stations.

Ctrac next decided to replace the 20-year-old IBM mainframe hardware, which was costing the company too much for downtime and maintenance.

(Continued on Page 56)

UNITED JERSEY BANKS DID.

"We chose two NCR Computer Output Microfiche systems to get over a million microfiche per year out on time. The NCR 5330's online/offline capability gives us every bit of the flexibility we need to service our 118 banking offices. And when we need it, we can always depend on superior NCR service." Hubert P. Clarke, VP Data Processing, United Jersey Banks.

COMPUTERISTICS DID.

"I've used every make of Computer Output Microfiche system over the years. There are obvious reasons why we chose three NCR systems. Speed and reliability. Our new 5330 recorders have increased throughput 30% over our previous system and contributed to a doubling of sales over last year." Thomas A. Cognato, President, Computeristics, Micrographics Division.

FIRST NH DID.

"We became a $550 million banking operation by making correct choices. We chose the NCR 5330 Computer Output Microfiche system. It was up and running in just one day, and our uptime since has been over 99%. In fact, I can't think of a time we didn't get our work done with the NCR 5330." Edward H. Lee, Vice President Operations, First NH.

NCR Micrographic Systems Division
Box 606, Dayton, Ohio 45401
1 (800) 543-8130 (In Ohio 1 (800) 762-6517)

NCR
Micrographic Systems Division

Bureau Ties Turnkeys to Mainframe

(Continued from Page 55)

Many of their inventory management customers, although pleased with the basic Ctrac services, next wanted to access their inventory files directly to enter transactions and update records rather than record them manually for future batch processing.

Therefore, Ctrac decided to permit clients to tie the Minitrac business system (incorporating a DG CS/70 MOD/C6 mini with 512K-byte memory, DG 50M- and 192M-byte disk drives, a DG 800 bit/in. tape drive, display terminals and printer) to the new mainframe as an on-line interactive system.

Normant explained that the new mainframe had to be "inexpensive to purchase and operate, be compatible with IBM hardware, capable of high-speed interactive processing and hardware- and software-compatible with other major equipment vendors since [Ctec's] clients have on-site systems from many different suppliers."

Product Survey

A survey was conducted of several products including IBM's 370/145, 4331 Group 1 and 4331 Group 2; Control Data Corp.'s Omega and Nixdorf's 8890.

The last system evaluated was Nixdorf's newly announced 8890. "Our financial evaluation of the 8890 indicated that it would actually cost us $300 per month less than we were currently spending on the 360/50. Based on that fact, we decided to pursue it further," Normant related. "And perhaps most important — it was indeed plug-compatible with IBM's hardware and software systems, as well as with all the other vendors' systems with which we interface," he added.

A Nixdorf 8890 Model 30 with 1M byte of memory and 600M bytes of disk storage was installed. The system includes a 1,600 bit/in tape drive, two high-speed printers and five video display stations. The 8890 can be directly interfaced on two on-site Nixdorf 380 data entry systems, each supporting 15 terminals. It is also equipped with telecommunications for transmission to off-site customers.

TEACH YOUR COMPUTER TO GET OUT THE COMPANY'S MAIL AND BRING IN THE SAVINGS.

With E-COM Service from the Postal Service. It costs less than doing it the hard way.

If your company has computerized mailing capability, you're now in a key position. You could single-handedly revolutionize its volume-mailing system with E-COM Service. And dramatically cut costs.

Here's how. Once your system is set up for E-COM Service, you simply execute the required program. You then transmit the data, by telephone or other communication carrier, to any one or more of 25 Serving Post Offices throughout the country. And E-COM Service–a cooperative effort between private-sector communication carriers and your Post Office–takes care of all the rest.

It prints the messages, which can be up to two pages long. Folds them. And puts them in bold blue-and-white envelopes, all at the Post Office. Which means that no one in your office has to do it. And no one has to take them to be mailed.

E-COM Service delivers the messages in just two days or less.

And it does it all for 26¢ for the first page. And just 5¢ more for the second. Your only additional costs are for telephone or communication-carrier services provided by others. So your company can spend less than they're spending now on supplies, labor, and postage–doing the job the hard way.

We can help you figure out the best way to access E-COM Service. And we can even give you any technical advice you might need.

So why not find out more about E-COM Service? Think of all it can do for your company. And imagine what that can do for you.

For more information, simply call or write your communication carrier or your local Postmaster.

E·COM®

IT DELIVERS SAVINGS ALONG WITH THE MAIL.

© USPS 1983

July Meet To Cover Health MIS

BALTIMORE — The Health Care Financing Administration (HCFA) Bureau of Program Operations will hold its fifth annual "National Conference on Management Information Systems (MIS) — Benefits to Management" July 24-27 in Arlington, Va.

The conference will provide a forum for sharing successful MIS experiences in health care, learning about new technology and sharing new practices in health care systems. Sessions will focus on electronic billing, office automation, communications and Medicaid/Medicare cost containment.

The organization is seeking outlines for presentations, including names of suggested speakers and panelists. Presentations should last from one to three hours on topics relating to Medicare and Medicaid information systems implications.

Preregistration costs $25 and should be sent to the HCFA, Office of Methods and Systems, Division of Systems Planning and Development, Systems Planning Branch, Room G-A-1 Meadows E. Building, 6325 Security Blvd., Baltimore, Md. 21207.

Program to Offer Master's in DP

BOSTON — Boston University's Metropolitan College will offer an employer-sponsored Professional Development Program next fall that leads to a Master's Degree in Computer Science.

This two-year program is intended for individuals with strong academic backgrounds and an employer's commitment to pay tuition charges. Full-time university faculty will conduct all courses on Friday afternoons and Saturday mornings at the Digital Equipment Corp. training facility in Bedford, Mass.

Applications for September's program are due June 1 and are available from BU Metropolitan College, 755 Commonwealth Ave., Boston, Mass. 02215.

'They Say Piano was His First Love, But He Had to Eat!'

Job Shop Metal Fabricator Turns To Real-Time Shop Floor Tracking

By Jim Holmes
Special to CW‡

AUSTIN, Texas — The installation of a real-time shop floor tracking system in a job shop environment has helped a metal fabrication manufacturer here automate its books and expand its business.

Grentek, Inc. is a medium-size job shop that specializes in metal-fabricated products. Most of its customers are high-tech industries located in the area.

In 1980 Grentek was located in an 11,400 sq-ft building, employed 40 people and had a booming business. The owner of Grentek, Bill Howard, felt the time was right for expansion. To support this expansion, a computer system was needed. A wish list was composed outlining the functions required of the computer system. These included an accounting system to automate the bookkeeping functions of the business and a manufacturing system designed for a job shop environment that included job estimating, tracking and costing.

There were many accounting systems that would do the job for Grentek. However, investigation failed to turn up any software that came close to meeting Grentek's manufacturing requirements.

These requirements were refined, at which time the job tracking system took on some added functions. To minimize people time and improve tracking accuracy, it was decided that the use of a family of shop floor terminals would be a definite advantage and a requirement of the system.

Change of Focus

When it became obvious that Grentek was not going to find a system to fit its needs, the decision was made to select a computer based on its ability to interface to the shop floor terminal(s) selected and to have a custom job shop package written.

The shop floor terminal found that best fit the company's needs was the Burroughs Corp. Series MT1500. Used as an optical character recognition (OCR) reader to retrieve tracking information from route sheets, it has a numeric keypad that allows operator input. Burroughs also supplied a software package called Manufacturing Data Communications Systems (DACS) that runs the shop floor terminals, provides job tracking and inventory control and has the hooks and handles in place to allow the system to interface to the existing manufacturing control system.

Shop Floor Terminals

The configuration that was selected was a Burroughs B920 computer with eight shop floor terminals and several CRT terminals, 80M bytes of fixed disk, several matrix remote printers, a letter-quality remote printer for the OCR-readable route sheet and two matrix line printers. In addition, Grentek purchased Burroughs' Job Accounting and Costing system (JAX) and a program generator software package from Wilmark, Inc. called Adept.

By fall 1981 the system

(Continued on Page 58)

Course Covers Basic

NAPERVILLE, Ill. — Deltak, Inc. has announced a multimedia course series on programming in Basic. Called "An Introduction to Computer Programming" (No. 7EB-A99), the course was developed in conjunction with Guild Sound and Vision in Peterborough, UK.

The four-part series, which assumes no prior knowledge of programming and can be used by individuals or groups, provides a general overview of computers and programming concepts and discusses loops, address arithmetic operations, strings and arrays, sorting and subroutines, Deltak said.

Courses can be leased for between $50- to $125/mo or purchased for $1,750 each. Deltak is located at 1751 W. Diehl Road, Naperville, Ill. 60566.

Here's Why Precision Visuals Is Now The Leader In Graphics Software Tools!

One Program Drives Many Devices

This single advantage can save you hundreds of hours of programming time. It enables you to use your hardware (both host computer and graphics devices) to its fullest. It protects your software investment against obsolescence and frees you from exclusive ties to hardware vendors.

Precision Visuals currently offers tailored interfaces for over 30 graphics devices from these companies: AED ☐ Applicon ☐ Calcomp ☐ Calcomp lookalikes ☐ Chromatics ☐ DEC ☐ Digital Engineering ☐ HP ☐ Houston Instruments ☐ IBM ☐ Imlac ☐ III ☐ KMW ☐ Megatek ☐ Printronix ☐ Ramtek ☐ Raster Technologies ☐ Sanders ☐ Selanar ☐ Servogor ☐ Tektronix ☐ Tektronix lookalikes ☐ TI ☐ Trilog ☐ Versatec ☐ Visual Technology ☐ Zeta.

Make better decisions, faster, using GRAFMAKER's specially-placed annotation and color.

Build highly interactive computer-aided design applications with the DI-3000 core system.

They Run On Most Popular Computers

Including IBM, VAX, PRIME, Hewlett-Packard, CDC, Honeywell, Data General, DEC 10/20, Harris, Univac, Cray, and DEC PDP-11.

Precision Visuals software tools require a surprisingly small amount of computer resources. Even on smaller machines they provide access to the full capabilities of the CORE graphics standard.

Rich Capabilities Mean Limitless Applications

Precision Visuals software tools are proven in applications such as computer-aided design, business graphics, process control, mapping, geological data analysis, document layout, plus many specialized applications. System integrators (OEMs) use them as the graphics nucleus in turnkey systems and as the graphics component of database management and financial modeling systems.

$12,000 For Our Most Popular System

DI-3000™, the core system, starts at $8,000 and goes to $12,000 for our most powerful and best-selling level. Add $6,000 for GRAFMAKER™, the business presentation specialty system, and you'll have one of the most versatile graphics systems available at any price. Other popular options include the METAFILE SYSTEM for a device-independent picture library, and our new CONTOURING SYSTEM for advanced surface graphics.

These are single-CPU, end-user, U.S. list prices. Multiple CPU and OEM discounts are also available.

Find out how Precision Visuals graphics software tools can open a new world of flexibility, economy, and standardization for your graphics applications. Call us at 303/530-9000.

"At Martin Marietta, DI-3000 serves as a common interface between our numerous graphics devices and software applications. We use DI-3000 for applications including structural analysis, business charts, graphs, animation, 3D modeling, and general-purpose graphics."

Karin Bruce
Senior Graphics Software Engineer
Martin Marietta Denver Aerospace

Precision Visuals

6260 Lookout Road
Boulder, Colorado 80301 USA
303/530-9000
TELEX 45-0364/TWX 910-940-2500

Amsterdam: Ponder Associates
Phone 030445352 / TELEX 70834
Sydney: Techway
Phone 02920856 / TELEX 27987
Tokyo: Nichimen Company Ltd.
Phone 032775017 / TELEX 22329
Zurich: Computer Graphix AG
Phone 018323462 / TELEX 875447

Job Shop Goes to Real-Time Shop Floor Tracking

(Continued from Page 57)

had arrived and the appropriate people were trained. The first software package to be installed was the JAX. The installation was uneventful.

However, the installation of the job shop system did not go as well. The Burroughs-supplied software that supported the shop floor terminals would not be deliverable until mid-1982. This was not of too much concern since Grentek still needed to create its portion of the job shop system, which would include part estimating and quoting and job definition and costing. This was to be done with Adept.

As with most generative software, it was soon discovered that it was easy to generate programs, but difficult to get them to work together exactly as imagined. The system design was reworked many times before a livable design was produced that was also compatible with Adept.

In addition, certain functions could not be performed within the confines of Adept.

Consultant Hired

In mid-1982 a consultant was hired to complete the job shop system. By fall, key portions of the system were working. However, the Burroughs software would not be available until late 1982.

By September 1982 Grentek had expanded its manufacturing capacity by increasing its plant size to 25,000 sq ft and installing $500,000 worth of new machinery. The increased capacity and work load soon revealed that portions of the system could not keep up with the new volume of requests.

By January 1983 the modified software was installed and working fine. Attention was then turned to the newly arrived Burroughs shop floor tracking software. Installation was quick, taking only one day.

However, the hooks and handles for the interface to existing systems were designed for batch input and Grentek wanted a real-time environment. Also, there were some mismatches in field sizes between the Grentek-developed system and the Burroughs system. The necessary changes were made, and the system went on-line in March.

The integrated job shop system consists of three main modules: a shop rate and price/lot module, an estimating and quoting module and a job tracking and costing module.

The system works as follows. Customers submit blueprints of parts for bids. Grentek enters these parts into the estimating module, detailing the steps that are necessary to manufacture each part. For each step entered, a shop function is selected from the shop rate file. Since the shop rate costs are already known, the rate quantity is entered.

Once the part and step information is complete, a cost estimate is run which computes unit cost for the part for each of the lot sizes defined in the price/lot file. Costs are examined and can be overriden. Then a quote sheet report is generated showing the unit cost for each of the lot sizes for which the customer has requested bids.

If the customer accepts Grentek's bid, a job is created for each of the parts to be built. The step information for the part to be built is automatically moved into the job step file. Critical due dates are then assigned to certain steps. Once the job and step data is complete the job is released and a route sheet created.

Once work starts on the job the tracking system takes over. Each employee who works on the job logs on and off the shop floor terminals. The method is simple.

The route sheet is "swiped" through the OCR reader of a shop floor terminal as is the employee's badge. The employee then enters the step number being worked on. That is all that is required for logon.

For logoff information the employee enters pieces completed. The tracking system automatically posts elapsed time, date complete, pieces complete and employee initials to each job step requiring work. Actual times are costed, and a costing inquiry and report is available that compares times and costs for actual vs. estimated.

Once manufacturing is complete the pack and ship work center generates the pack and ship document and ships the job. After the job is invoiced and all outside service costs are posted to the job, a final costing report is run using quantity invoiced to produce the final cost calculations. The costing information is put into the cost history file. The job and step data is then deleted from the system.

It should be pointed out that things did not always progress smoothly. The system took considerably longer to get up and running than was originally projected. The expectations of what could be done with Adept were overly optimistic. And, of course, the initial budget estimates for hardware and software were exceeded.

However, Adept has been a valuable tool, without which the development time and expense would have been much greater. The system works, and the people who use it are continually thinking of ways to use those few more enhancements.

Holmes is the owner of Soft Concepts, a computer consulting firm based in Austin, Texas.

We've cut the mustard...

at R.T. French

We're Cyborg Systems, and we solved the Payroll/Personnel problems at R.T. French. We'd like to do the same for you.

Cyborg has developed the most flexible, comprehensive On-Line Payroll/Personnel software package on the market. We're flexible enough to serve any industry, on most any brand of mainframe. In fact, we run on ten of the top mainframe manufacturers' equipment.

Give us a call. We'll show you how we can cut through your problems, as we've done for R.T. French and hundreds of other companies.

Cyborg Systems, Inc.
The Payroll/Personnel People

John Kluska • 2 N. Riverside Plaza • Suite 2160
Chicago, Illinois 60606 • (312) 454-1865
Telex 9102216009

Chicago • New York • Los Angeles • Atlanta • Dallas • Philadelphia • Ontario

Inventory Control System Helps Manufacturer Retain Quality, Competitive Prices

HENDERSONVILLE, Tenn. — Maintaining quality work and good customer relations are one priority for a manufacturer of hot-melt adhesive applicators here. But Mercer Corp. here must still maintain competitive pricing — and that takes inventory control.

"At one time we weren't adequately controlled," Dan Polk, director of data processing and inventory control, admitted.

The company's NCR Corp. I-8271 computer system with the NCR Interactive Manufacturing Control System II (IMCS-II) software package was installed in 1979, and Polk began optimum application of the system after his arrival in early 1981.

The system now gives Mercer strong, positive inventory control, as well as other production management, engineering and marketing support in the manufacture of hot-melt adhesive applicators.

Software Modules

The software package includes several modules: inventory management, bill of materials and other processing. The accounting modules include general ledger, accounts receivable and accounts payable.

"The vendor wrote a program to interface the accounting and order processing functions, which gave us the capability [to audit] before posting the general ledger," Polk said, "and that's a critical tool. We also have a custom pricing program for the engineering department so it can develop a sales catalog listing all the parts and what they must sell for."

Several other programs in the NCR IMCS-II system were modified to fit it to the firm's operations, such as the material requisition. Tied in with the inventory management module, it now allows Mercer to initiate a production work order for a machine, have it allocate the parts and, at the same time, print a report listing those parts in numerical sequence with a description, the quantity, location and cost of each.

"We use the bill of materials module as the brain center for the entire application," Polk said. Mercer's engineering department designs more than 7,000 parts to be used in the manufacturing process and enters information about them in the bill of materials.

Before computerization, the parts for each machine manufactured had to be hand-listed, ranging from 250 to 2,000 parts per machine — a tedious, error-prone and time-consuming process.

For a given machine to be built, the parts were listed, the number needed, calculated down to the smallest screw, was listed, and each of those parts were assigned a price to arrive at the total material cost.

Now Mercer engineers are able to take existing structures and add, delete or otherwise change what is needed for a given set of customer specifications, and total materials costs are known immediately.

The bill of materials module itself ties directly into the inventory management module. Three data display terminals and a matrix dot printer are located in the inventory control area of the plant. One is also located in the purchasing and receiving area.

The inventory control clerk manages all in-house production orders for a given machine to be manufactured, entering them into the system through the bill of materials structure. The clerk also takes information from purchased items, pricing them as they come in.

As an order is received through order processing for a specific machine, the parts are allocated and identified in the stockroom; the earmarked parts are then pulled as needed during fabrication of the machine.

The materials are priced before the customer is quoted a price; then as the materials are actually pulled from stock, any variances of actual costs are noted. This way the firm knows at all times what the profit will be on the production of that machine even before the first part is pulled from inventory.

"We're still a job shop," Polk pointed out. "We're working to achieve standardization, and I feel one of the keys to achieving that goal is being able to make the data in our computer system 99% accurate, especially in the bill of materials module."

Mercer now controls about $1 million in inventory. "The inventory management module has become the ultimate key we use to control and maintain inventory of purchased items as well as inventory items manufactured in-house," Polk said.

"It has also become a valuable tool in cost information that we must have to answer questions from salesmen about manufacturing costs on a given item. We can run a material requisition report on the item and give him the information based on the last time that item was made, including overhead, labor and materials costs. It gives a very accurate picture. If we change an item in a material requisition or bill of materials, it is reflected when we run the report," he added.

Inventory Management

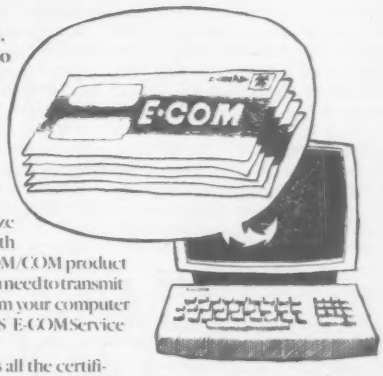
Polk added that the inventory management module is a management tool for pricing information, movement of materials and control of inventory that is tied in with the order processing module.

Orders now come in through sales, and as they are entered into the order processing module, the system can display on a screen or in a printed report all parts that are required. Through that report, proper in-house work orders or outside purchase orders are generated. These orders, in turn, go into the customer files, and reports are made there that affect accounting functions such as accounts payable and accounts receivable.

"Through the inventory management module — which is the key au-

(Continued on Page 60)

Let SDM® teach your computer to talk E·COM®.



With SDM software. The quick, easy way to enter the age of electronic mail.

Your company can now access the U.S. Postal Service's E-COM (Electronic Computer Originated Mail) Service and realize dramatic savings in both costs and time. The SDM/COM product is the only software you need to transmit mail electronically from your computer to their computer. USPS E-COM Service takes care of the rest.

SDM/COM contains all the certification, formatting, transmission and interfacing requirements necessary for E-COM. And it only takes one day to set up SDM/COM on your IBM (OS/DOS), DEC (RT-11/VMS) or Turnkey system. SDM/COM has been tested and proven by actually sending over one million letters via E-COM.

So why not turn your existing computer system into an expedient, cost-effective mailing system? And teach your computer to talk E-COM.

For more information, simply call or write:
Software Development and Maintenance, Inc.
P.O. Box 668, Fuquay-Varina, NC 27526,
919/552-5662.

COM-MAIL'S CARRIER ROUTE SORTING SYSTEM WINS BENCHMARKS HANDS DOWN.

The winner in benchmarks across the country, COM-MAIL™ has established a new performance standard for the industry. Where it counts most, COM-MAIL systems come through with significant bottom line savings. That makes you a winner, too!

CARRIER ROUTE SORTING SYSTEM (CR$S). Postal Service discounts of up to $40 per thousand mailing pieces.

DUPLICATE ELIMINATION (MERGE/PURGE). Surpasses commonly used match codes, identifies duplicates even where misspellings, missing characters or transpositions exist.

GENERALIZED SELECTION. Provides simultaneous multiple selection tasks, including ZIP Code demographic information against data in user files.

OTHER CAPABILITIES. List Conversion, Regular Presort, Label Printing. Used singly or in any combination with other products, this system is the most sophisticated mail management product currently available.

ASK ABOUT OUR ZIP + 4 PRODUCT.

Discover how COM-MAIL's benchmark-winning system can pay off for you. Call us Toll-Free at

(800) 368-5806

Local (202) 537-2577

COMNET
COMPUTER NETWORK CORPORATION
COM-MAIL™ Division, Dept. CW203
5185 MacArthur Boulevard, N.W.
Washington, D.C. 20016

☐ I WANT TO SAVE MONEY IMMEDIATELY. CALL ME TO SET UP A FREE BENCHMARK
☐ Send more information

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
PHONE _____

Products require IBM/COMPATIBLE MAINFRAME

Prefab Home Supplier Nails Down DBMS

MINNEAPOLIS — The combination of a data base management system (DBMS) and an on-line program development tool have aided the efforts of a manufacturer of precut homes to meet customer needs from initial contact through completion of construction.

For many Americans, skyrocketing real estate prices have turned conventional home ownership into an all-but-impossible dream. Yet for innovative individuals and companies, the present market offers unique opportunities.

At least that is the viewpoint at Miles Homes, Inc., a Minneapolis-based maker of precut houses for do-it-yourself home builders. Miles offers materials and financing for over 50 standard home designs, plus a list of optional variations, to customers all over the U.S. Meeting these customers' needs calls for an information system unique in the home-building industry. And with Adabas and Natural, Software AG of North America, Inc. products for data base management and on-line program development, respectively, Miles has such a system.

According to Ken Warner, data base administrator and senior analyst at Miles, the company started investigating DBMS offerings in the summer of 1980. "In addition to Adabas, we looked at Cullinet Software, Inc.'s IDMS, Intel Corp.'s System 2000, Cincom Systems, Inc.'s Total, Computer Corp. of America's Model 204 and IBM's DL/1. Before long, we'd narrowed it down to the first three products."

Combination of Factors

A combination of factors tipped the balance in favor of Adabas. "Adabas offered us a price break in our IBM 4331 DOS environment. But even more important, we didn't have a great big DP department, and it was clear Adabas would be simpler to install and get started on than any other system," Warner said.

"With IDMS, we were looking at bringing new people on board, then spending three to six months just to get them educated to a point where they could get started," he said. With Adabas, however, users were off and running after one week of in-house classes.

Another factor was the feeling that Adabas would be easier to live with and adjust to as Miles' needs changed.

Once selected, the new DBMS had to be installed on a tight schedule to coincide with the planned move of Miles' corporate headquarters. According to Warner, the use of Natural for program development was essential to the company's on-time system implementation.

"Natural enabled us to do more with fewer people. We took delivery in March 1981, and by June 15 we had our on-line order entry system up in time to meet our deadline. And we also got a substantial head start on several other applications," Warner said.

The current system not only takes orders but tracks each customer from order entry through financing and construction. The financial system has to be flexible in keeping with the nature of Miles' markets. For example, projects are often begun under no-down-payment construction loans, then later refinanced by means of conventional mortgages.

Also, since parts shipments must be made throughout each project's construction phase, raw material purchasing and inventory accounting are tied into the system companywide, enabling Miles' five manufacturing plants and distribution centers to meet customer commitments in a timely yet cost-effective manner.

Finally, the system is also used to generate customer profiles for sales and marketing and will soon be used to automate sales commissions.

"We're a growing organization," Warner said. "Even now, after two years with Adabas and Natural, I feel we've barely scratched the surface of what we could be doing. Yet when I think of where we'd be without these products, I know the decision we made was the right one for us. And I'm confident that as we go along further, we'll continue to find that Software AG's products really do provide a good foundation for our needs here at Miles."

Control System Aids Company

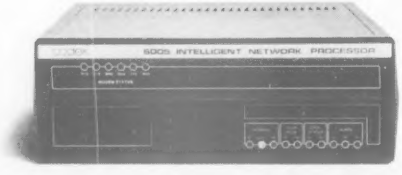
(Continued from Page 59)

dit trail back through order processing — before we invoice anything, we can detect whether that item has been placed into inventory so it can actually be removed," Polk explained.

"This prevents a fictitious minus status in inventory, with resulting incorrect [pricing] information. Invoicing on the order processing is designed to tell you a percentage difference between actual cost and selling price, which will tell you if you're making a profit.

"Within a week, a person in purchasing who had no previous computer experience was able to enter data and use the system, and she was working on her own with manuals, menu layouts and very little help from me," Polk said.

HOW TO GET A NETWORK OFF THE GROUND.



Codex 6000 Series Intelligent Network Processors for minicomputer networks.

Say you have a small minicomputer network. A dumb terminal here, a dumb terminal there, and a DEC, HP, Data General or some other minicomputer miles from either. They're probably joined by modems and phone lines. But that's no way to run an efficient, economical network. And it doesn't give you any room to grow.

To really get a network off the ground—to really get one running efficiently—you need to take a different route.

You need a Codex 6000 Series Intelligent Network Processor specifically designed to improve the efficiency of smaller networks.

In a minicomputer situation with as few as two dumb, asynchronous terminals, these statistical multiplexers will boost operating efficiency, reduce line costs and protect your data from errors caused by line disturbance.

The model 6001 can support as many as eight asynchronous terminals. The 6005, as many as 16 asynchronous and synchronous terminals. Or any combination of word processing or graphics terminals and printers.

Both models are inexpensively priced. So the money you save on line costs and error-free transmission will bring you a healthy return on investment quickly. Our Application Engineers offer planning expertise to help you get off the ground that much faster. And when you grow, we'll show you how these stat muxes can be linked to larger 6000 Series products as your networking needs expand.

In short, Codex 6000 Series Intelligent Network Processors can push your small network in the direction it ought to be going. Up.

Call **1-800-821-7700** ext. 898 for more information or write: Codex Corporation, Department 707-98, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

MOTOROLA INC. Information Systems Group

SEE US AT NCC, MAY 16-19, BOOTH #S-5050.

© 1983 Codex Corporation

Handles Growth, Increases Efficiency

Control System Irons Out Firm's Problems

ERIE, Pa. — A Pennsylvania manufacturer said it has achieved greater efficiency, better management information, more cost control and improved customer service since it installed a computer-based manufacturing control system.

Lord Corp., a high-technology manufacturer headquartered here, is a specialist in the production of products utilizing the bonding of rubber and metal. The high growth it experienced in the late 1970s brought problems to management's attention. The addition of two more manufacturing plants resulted in management information problems.

And when the company decided to integrate its multiplant operations, the problems grew even more acute.

Lord sought a computer system that could provide management information in a timely manner to both the remote plants and the central office. In 1979, after examining proposals from a number of vendors, Lord implemented a Univac Industrial System (Unis) 1100 interactive manufacturing control system, supplied by Sperry Corp., and a Sperry 1100/62 computer system.

"The Unis system had all the pieces in the right place. It seemed to be the most reasonable approach," Paul Ditmore, manager of data processing, said.

"The DMS data base management system [used with the Sperry Series 1100 computers] is a pretty solid piece of software and has always done a good job for us."

Having a strong data base system was important to Lord. The old system, created by the company, worked fine until a change was needed. The problem was no data base management system existed that simplified making changes; as a result, it took time to implement them.

One of the most interesting aspects of Lord's new system is that it performs central material and production planning for the company's multiplant operation.

The company makes a material requirements planning (MRP) run once a week for all its plants. The system prepares manufacturing orders and production schedules for each plant, then informs each plant of its requirements. The system controls one local and two remote plants. A third remote plant will soon be added.

Dynamic Priority List

Each day, a remote printer spells out the work schedule at each plant in the form of a dynamic priority list. During the day, the plants report back the production status. This information and a new, up-to-date priority list are printed each day.

Previously, information was always several days behind current production. Remote plants entered all inventory transactions and production progress on cards, then mailed them to the home office.

"Now," said Michael LoSapio, manager of industrial planning for the Industrial Products Division, "we do everything on-line, including edits. When we inaugurated the on-line system, we had a ceremony and burned the card file."

The information generated by the on-line system has created respect at the remote plants for plans made at the home office. It is accurate, timely and a utility to local management, rather than an obstacle. The remote plants no longer wonder whether the home office knows what it is doing.

"When we show that we can do what we say, it makes a big impact. If any problems arise, we can correct them immediately," LoSapio pointed out. "Credibility is important because we don't have much face-to-face dialogue with the remote plants."

The accuracy of information has made it possible to pinpoint orders on the shop floor — a fact that has proven helpful to both marketing and customer service.

The more realistic information has

(Continued on Page 62)

IMC Elects Officer Slate

BETHESDA, Md. — The International Information Management Congress (IMC), a worldwide association for micrographics and information management, has announced the election of new officers and the appointment of directors for 1983.

Frank Kohlmeyer, executive vice-president of Realist, Inc., has been named chairman of the board at IMC; and William McGlone Jr., market manager at 3M Corp., has been elected president. John Hensel, an international director at 3M, has been elected vice-chairman of the organization; and Don Avedon, author of *Computer Output Microfilm*, will remain IMC's executive director. Elected treasurer was Michael Rothbart, chairman of Terminal Data Corp.

IMC can be reached through P.O. Box 34404, Bethesda, Md. 20817.

HOW TO GET A NETWORK OFF YOUR BACK.

Codex Data PABX for minicomputer networks.

You're in a situation now where there are more than 50 users in your minicomputer network. All of them working on dumb terminals directly linked to your processors. The situation is such that your processing capacity has just about reached its limit.

Do you add more minicomputers? Or do you add more processor ports?

Don't do either. There's a better way: The Codex IMS 7800 Data PABX.

Our Data PABX monitors and controls the way your people access your minicomputers. And it does such a good job that you can get more out of DEC, Prime, Data General or other minicomputers—even add more terminals—simply by making better use of what you already have.

So, for instance, instead of having dumb terminals dedicated to any single minicomputer, Data PABX lets you get any processor, from any terminal, from any point in your network.

This approach makes even more sense when you consider that any given terminal is only on-line about 20% of the day. It's a more efficient use of computer resources, more economical, and altogether easier to implement than any other option in front of you.

What's more, this approach is backed by Codex. Before the sale and after. So you know it will work when you install it. And you know it'll work long after.

Data PABX. It can cure all the pains of growth in a local or long-haul network.

Including the one in your lower back.

Call 1-800-821-7700 ext. 894 for more information or write: Codex Corporation, Department 707-94, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

MOTOROLA INC. Information Systems Group

SEE US AT NCC, MAY 16-19, BOOTH #S-5050.

© 1983 Codex Corporation

Manufacturing Control System Handles Growth

(Continued from Page 61)

helped manufacturing project more accurate delivery dates and has cut down on the number of questions from customer service.

"Customer service can now go to a visual display terminal and see where an order is and how long it will be until the parts are shipped," LoSapio said.

With the Unis system, a planner can quickly look at the priority of each order and change the priority immediately if necessary.

Group Orders

The system also enables management to group orders within a given horizon to reduce setup costs. If several manufacturing orders use the same rubber or metal components, for example, the planner can schedule the shop to keep the same mold in a press to produce the pieces early for those orders. As orders are received, the premade parts can be removed from inventory.

On-time delivery, an important aspect of Lord's business, has improved, due primarily to a closed-loop MRP system.

"A closed-loop MRP system has helped us to manage inventory shipments and work load to meet company plans," Robert Barron, manager of materials, said.

"In the past, we averaged about $5 million in past due shipments a month, based upon our promised delivery dates. We have reduced that to less than $500,000 a month.

"After our first MRP run, we rescheduled $500,000 of production. We found we were making things we didn't even need," Baron said. "The MRP system has enabled us to grow and manage our inventory investment at the same time. That in itself is worth a lot."

When Lord went on-line, the accuracy of its inventory improved dramatically. At the end of 1981, it averaged 97%.

Thomas Quinn, controller of the Mechanical Group, added, "Now we just take the computer printout and audit it. We don't have to take a physical inventory for a large majority of our stockroom parts anymore, and that saves a lot of time for stockroom personnel. More than 2,000 stock transactions occur daily on the system."

With the on-line system, Lord is also finding parts in inventory that are obsolete. Every three months, inventory is checked for parts lacking activity during the previous 18 months.

The on-line system has also given Lord a better control on costs. The system not only tracks the costs of labor and raw materials, but it also keeps account of the different machines involved in making a product.

"When we work on an order we can establish the machines and tools needed to produce it, then we can amortize that asset cost in the product," Quinn said.

"We did standard product costing before, but we could only do it once a year. It now takes five to nine hours of processing and we do it every quarter. If we wanted, we could do it every month," he added. "By looking at every quarter, the company can see the effects that planning changes have on costs."

The cost information generated by the system serves the company in the area of corporate planning. The controllers take data from the system and feed it to the Sperry Financial Integrated Control System (Sufics) software package for economic modeling. From this data, a five-year plan is developed and updated every quarter.

"There's no doubt that we made a lot of progress relying on the closed-loop manufacturing control system," William R. Burrows, manager of industrial products manufacturing, said.

Noting that production is up "quite a bit," he said, "The key is that we have an integrated management system and we are headed toward a common goal. Our system produces a plan, but the trick is to follow that plan. We have been able to act on it and report back." Reporting back to the on-line system is important because it has provided the visibility needed to keep on top of production.

"We know in the morning what happened yesterday," Burrows asserted.

New applications include plans to use the Sperry system to simulate different manufacturing scenarios. Company engineers enter different variables into the system to determine how many people and how much material are needed to meet the proposed conditions.

With its emphasis on technology and research, it's not surprising that Lord has spent most of its time making production more efficient. The company has spent little time developing traditional accounting systems, but this will change ... and Sperry equipment and software are expected to help here, just as they helped improve production.

Nielsen cable network product usage survey, NHI Sept. '82. Subject to qualifications, available upon request.

THE ESPN AUDIENCE HAS 40% MORE COMPUTER BUYERS. YOU'LL BE IN THE CHIPS.

ESPN REPLACES NETWORK UNDERDELIVERY IN BASIC AND PAY TV HH

	TOTAL COST $(M)	TOTAL U.S. GRP	TOTAL U.S. INDEX	CABLE GRP	CABLE INDEX	PAYCABLE GRP	PAYCABLE INDEX
NETWORK SPORTS SCHEDULE (6 SPORTS ANNOUNCEMENTS)	2500	323	100	268	83	273	85
NETWORK + ESPN (5 NETWORK SPORTS & ESPN ANNOUNCEMENTS)	2500	301	93	348	108	423	131

SOURCE: July '82 NTI On-Line Cume Facility Costs based on 1982 industry estimates

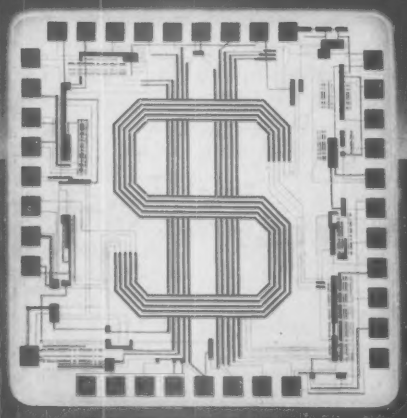
ESPN's audience buys more computer hardware and software compared to the U.S. average. 56% more ESPN viewing households own video games. 33% more own home computers. And 40% more of ESPN's adult male viewers are responsible for the purchase of business computer systems.

Our audience spends more on computers because they can afford to. They have a higher household income than the U.S. average.

But you're not reaching this high consuming, upscale audience with your broadcast network buys anymore. More affluent viewers are turning to cable TV and away from the networks. The networks just can't deliver these homes like they used to. But ESPN can.

Adding ESPN to a network sports schedule provides greater weight in TV households with cable and particularly pay cable. And because of our heavy concentration of male viewers, we deliver more upscale men per household than the broadcast networks. All for a low out of pocket cost. How do we do it? It's simple. ESPN is the Total Sports Network. And as everyone knows, men love to watch sports. And that's exactly what they've been doing.

So, plug into ESPN's audience and you'll be programmed for success.



ESPN™

THE TOTAL SPORTS NETWORK™

ADVERTISING SALES OFFICES: NEW YORK Michael O. Presbrey (212) 661-6040 · LOS ANGELES David Aubrey (213) 738-6003 · CHICAGO Bob McCarthy (312) 938-4223

Firm Finds Real Benefits of MRP During Implementation Process

By Ted Deziel
Special to CW‡

MINNEAPOLIS — The recent implementation of manufacturing resource planning (MRP) at Longyear Co. here has made it apparent that the real benefits of MRP result from the implementation process itself, rather than the use of a specific computer configuration or software package.

The MRP implementation process at Longyear began in May 1981 and continues today. So far, a production planning process has been developed where top management is involved in the monthly statement of the production plan. The production plan is accurately translated into inventory through MRP.

Accuracy of on-hand balances has improved as a result of cycle counting from 30% to over 96%. Accuracy in tracking parts due in and due out (open order accuracy) has improved from 71% to over 98%.

In addition, bill of material accuracy has been monitored and maintained at 98%. Availability of accurate, timely information throughout the company has also improved users' confidence in the systems and has generally created a more positive working environment. Finally, operating departments are sharing information that is centrally maintained rather than using independently maintained information. These benefits were achieved by using an implementation process based on four major principles.

Management Support

Much has been written about the importance of top management commitment in implementing MRP. At Longyear, the top management group followed up on a middle management suggestion to explore the benefits of MRP. After visiting companies that successfully used MRP, attending outside MRP courses and evaluating feedback from people throughout the company on MRP, top management committed itself to the MRP project.

This commitment was made in the face of the highest business level in Longyear's history. Without dwelling on details, it is sufficient to note that without solid top management support, the MRP project would not have happened.

MRP formal education was undertaken initially a full year before the project began. By May 1981, 19 people had attended a total of 35 outside MRP education courses. Another 17 outside courses were attended over the next year and a half.

The outside education assured that the project team members were all "singing from the same hymnal." Efforts could be directed toward the real issues, not the pros and cons of various approaches to MRP. In-house education was accomplished through use of a videotape program. Project team members set aside two hours a day for 2½ months to train as instructors on the tape program. The newly trained instructors then conducted classes for their departments. Everyone in the company was exposed to a minimum of two hours of education.

(Continued on Page 64)

A Major Conference

Microcomputers and Organizational Productivity

June 7 & 8, 1983
Boston Park Plaza Hotel
Boston, Massachusetts

Panel Discussions on:
- Software Development
- Management Experience

Vendor Demonstrations of Micro Software for Major Organizations

Keynote Speakers:
Peter G.W. Keen, Micro Mainframe, Inc.
C. Lawrence Meador, Research & Planning, Inc.
Mitchell Kapor, Lotus Development Corp.
Frederic G. Withington, Arthur D. Little, Inc.

Contact: Micro Conference
215 First Street
Cambridge, MA 02142
(617) 864-0900

In 3270 Network Development, ICCI is Getting You There.

We set the first generation standard

In 1978, ICCI introduced our CA12™—the *first* protocol converter to support both BSC and SDLC protocols. It set the standard for the first generation of protocol converters. And the CA12™ was only the beginning.

We introduced the second generation

In 1982, ICCI brought you the CA20™—the *first* second generation protocol converter.

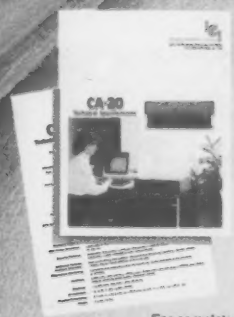
Compare our CA20™ with any other protocol converter available today. You'll see the results of extraordinary attention to engineering detail. Still the most sophisticated product of its type, our CA20™ features:

- True 3270 emulation
- Dual synchronous host support
- Asynchronous switching capability
- Automatic logoff and disconnection
- User selectable port configuration
- Comprehensive hardware diagnostics
- Remote trace and testing capability
- Single card construction

We'll bring you the next generation

In 1983, we're bringing you new products and training programs for network growth. We've always anticipated your network problems. And we're bringing you solutions for today—and tomorrow.

So plan your network growth in new directions. And call or write to ICCI, 196 Broadway, Cambridge, MA 02139, Telephone (617) 864-3270. We'll help you get your network where you want it to be.



For complete technical details, ask for our CA20™ Data Sheet.

ICCI, 196 Broadway, Cambridge, MA 02139
(617) 864-3270 Telex: 95 1106

MRP Benefits Come From Implementation

(Continued from Page 63)

and many departments went through over 50 hours of formal education.

The education provided a good foundation for the detailed work that these people performed in MRP task groups. Shortly before the new system was in place, two weeks of training were given to familiarize all users with the mechanics of the system. Subjects covered during these sessions included reports, input forms and procedures and the use of CRTs.

Organization of the project team is the key element in the MRP implementation process. People selected for the project team will establish the implementation plan and make decisions on all major issues that arise during implementation. Just as important is the fact that the project team is the project as seen by others in the organization. A project team consisting of only management information systems personnel implies that the project is another data processing system, whereas a project team consisting of key user department members serves to define the project as a company system.

Longyear's MRP project team consisted of a cross section of managers:

- Production inventory control manager.
- Design engineering manager.
- Purchasing manager.
- Marketing manager.
- Data processing manager.
- General foreman.
- Materials manager.
- Assembly foreman.
- Manufacturing engineering manager.
- Plant manager.
- Accounting manager.

The composition of the project team established the view that this was a companywide system and that its success was the responsibility of the middle management group.

Project Manager

From this group, the materials manager was selected to serve as MRP manager. Since this position was full-time for the initial start-up period (1½ years), the duties of the materials manager were assumed by the production and inventory control manager. This arrangement provided the project team with a leader who had an excellent understanding of the systems and procedures that were in place as well as an established leadership position within the organization. It also reinforced the message that this was not just another DP system but a company system.

Once established, the project team identified the tasks involved in implementing MRP and met weekly to monitor progress.

Task groups were established to identify and accomplish specific tasks. A project team member would chair the typical task group, while the remaining task group members would be from departments closely involved with the activity being addressed. Task groups were established for these activities:

- Records accuracy.
- Bill of materials accuracy.
- Open order accuracy.
- Education and training.
- Computer software.
- Item analysis.
- Forecasting.
- Master production scheduling.
- Routing accuracy.
- Implementation.

The benefits that have resulted from the MRP system to date are a direct result of the many people involved in the task groups. All of the computer reports, forms and procedures that are now in place were designed and developed by the task groups and are supported enthusiastically by these end users.

DP support is as important to the MRP project as breathing is to living. Both functions are vital, both functions are assumed to be working properly and neither function is discussed much unless something goes wrong. Regardless of the MRP software that is purchased, some modification is inevitable. The implementation program at Longyear, in fact, encouraged users to design reports that would suit them.

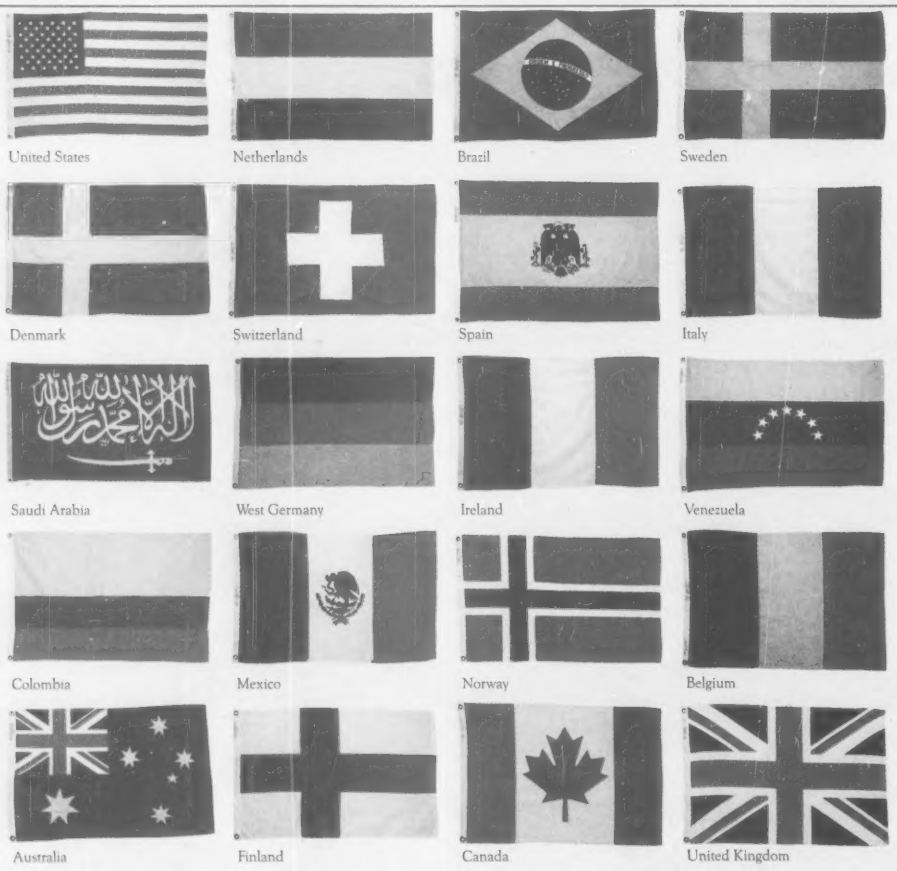
Once the system requirements were finalized, the purchased software package had to be modified and implemented as quickly as possible so that momentum was maintained.

While the software was being developed, the project team turned its attention to other activities such as training, preinstallation clean up and review of all data and finalization of new procedures. As far as the programming effort was concerned, no news was good news.

The software development effort was not very visible to most members of the MRP project team. However, it received a great deal of attention from the software task group. Weekly task group meetings were held to review progress against the schedule and to apply additional resources as required to remain on schedule. This type of DP support requires a user-oriented DP staff that is also technically competent.

The lead programmer/analyst in the Longyear project had transferred to DP from inventory control a few years before the MRP project began. His experience as a user and as a programmer was invaluable.

Deziel is DP manager at Longyear Co., Minneapolis.



Where in the world are people getting the most advanced information systems today?

It takes an experienced company to meet the worldwide demand for advanced information systems.

And nobody can meet that demand better than Ericsson.

Today Ericsson offers one of the broadest, most advanced lines of information products and services in the world, all over the world. From Saudi Arabia and Australia to Mexico and the United States.

More than 100 countries in all.

And wherever you find Ericsson you find a total commitment to customer needs. We have made that commitment in the United States by establishing a sales and service network, backed by our own manufacturing plants, research laboratories, training centers, maintenance and diagnostic centers.

If you're wondering who in the world can meet your information systems needs, the answer is simple. For your information, it's Ericsson.

Anaconda-Ericsson Information Systems, 7465 Lampson Avenue, P.O. Box 938, Garden Grove, CA 92642, (714) 895-3962.
In Canada, Anaconda-Ericsson Communications Inc., 1799 Argentia Road, Mississauga, Ontario L5N 3B1, (416) 821-9400.

For your information. It's ERICSSON

Inventories, Scheduling Under Control

System Aids Steel Firm in Maximizing Efficiency

CLEVELAND — A major steel producer reported it has gained control over its inventories and shop scheduling with the aid of a manufacturing system. In addition, the system has helped maximize the efficiency of operations throughout the divisions and subsidiaries of its manufacturing group.

Republic Steel Corp., headquartered here, accounted for nearly 8% of all steel produced in the U.S. in 1981. Republic also supplies the fabricating divisions and subsidiaries of its manufacturing group.

Most of the business accounting and order entry functions of the Republic Manufacturing Group were designed and programmed in the early '60s. Some 10 years later, during a decentralization process, the group's computer operations were merged with the companywide Business Systems Group data centers — five data centers in all.

In 1979, representatives from corporate, group and divisional levels were brought together to form a task force that would identify computer systems requirements within the Manufacturing Group and develop a plan to meet those requirements. Republic had felt the need for a better computer system, one that would maximize the efficiency of operations throughout the divisions and subsidiaries of the Manufacturing Group.

Six months later, a study by the task force indicated it would cost $8 million and take five years to achieve the necessary levels to satisfy the group's business information processing needs. The figures were based on in-house design and programming of the applications software.

In April 1980, Nils H. Jensen, a former materials manager for a fabricating division of a Philadelphia steel company, was hired as group director of systems, material and traffic to coordinate all of the group's systems activities and development.

"At that time, we had no systems people in the division," Jensen said. "We had no state-of-the-art expertise, we had a definite lack of information in the group and we didn't have the time to develop a system on our own."

The Solution

"We needed a system," Jensen continued, "that was flexible enough to install in all of our divisions." So began the criteria for the applications software. "It had to cover all aspects of the business, essentially materials requirements planning [MRP]. The software company had to have hands-on experience to assist in the installation of the system. We had to teach the divisional personnel not only the system but also the technique. For instance, how do you capacity-schedule for a manufacturing plant?"

Jensen, with the help of managers from the divisions, set out to evaluate eight major software systems that appeared to meet the group's requirements. Using the standard Wight and Landvater *MRP Software Evaluation Report* as a guide, six of the software systems were quickly eliminated from competition.

The system finally chosen was Xerox Corp.'s Computer Services' Manufacturing System. Fully integrated and interactive, the Xerox Manufacturing System is an on-line access system that allows for the immediate updating of all appropriate files each time a transaction is made.

Originally developed for Xerox remote computer services customers, the software can run on IBM computers and their software-compatible equivalents. The software is modular, allowing a user to pay for only the applications needed. There are options that enable the software to be customized to specific requirements. And for further modifications, on-line system programming techniques have been developed for customer use. Republic's Manufacturing Group uses the Xerox system without modification.

Initial Profile

In April and May 1981, Xerox Computer Services personnel performed an initial profile of a specific Republic division that would serve as a road map for installation of the entire system groupwide.

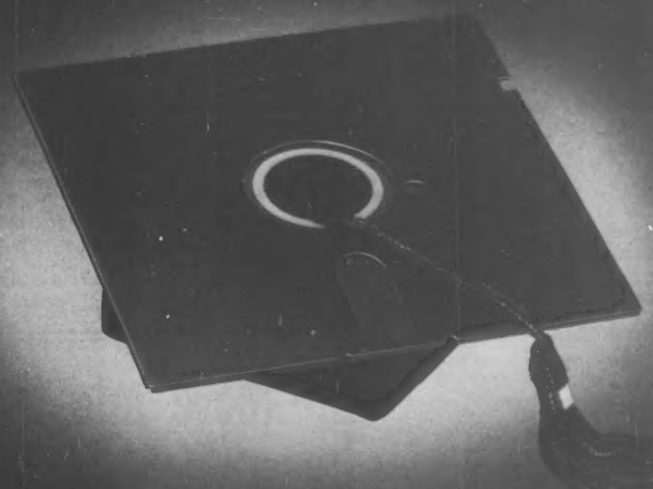
The objective of the profile was to determine the way the options in each application would be set to insure that the system would operate exactly in the manner needed by the division.

In mid-June, a Xerox advisory consultant defined the division's data, and Republic began loading it. During this period, Xerox personnel did more than just install the system.

Xerox Computer Services provided half-day and one-day training sessions to the group's selected people on each application. They also provided an option called Remote Computer Services. With this option, Republic's Manufacturing Group was able to try out the applications before making a final commitment.

(Continued on Page 66)

Your Personal Computer Tutors.



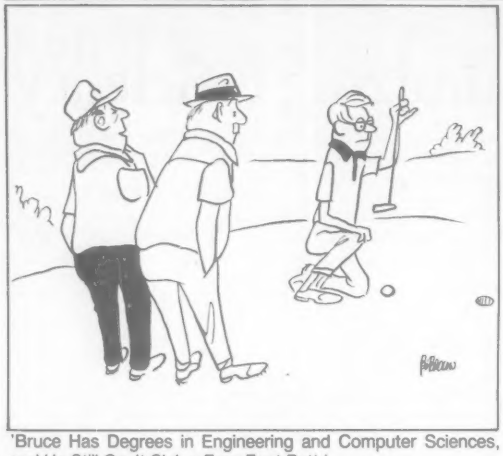
You don't have to have a degree in programming to understand your IBM PC and software. You can "Teach Yourself" with interactive learning diskettes that help you apply your software package in just 60 to 90 minutes.

These simple, step-by-step courses come with helpful texts and references, and cover all aspects of computer literacy, productivity software, operating systems and languages. Teach Yourself. It's the education you need without a lot of pomp and circumstance.

From DELTAK Microsystems. A division of DELTAK, the world's foremost computer educator, serving over 1 million information professionals for more than 12 years.

Have questions? Let's talk.
Call 800-2-TALK-TO
In Illinois (312) 369-3000 ext. 100

DELTAK Microsystems
East/West Technological Center, 1751 West Diehl Rd., Naperville, IL 60566



'Bruce Has Degrees in Engineering and Computer Sciences, and He Still Can't Sink a Four-Foot Putt.'

Firm Gets Manufacturing System

(Continued from Page 65)

Using the services option, the manufacturing system was implemented through computer terminals in Republic's offices. Republic now had on-line access to computers at Xerox data centers where the division files and software programs were stored.

Move In-House

After this evaluation and usage period, the software and data base were moved from the Xerox computer to Republic's computer, establishing an in-house system.

"The installation of the data base," Jensen said, "along with Xerox manufacturing software, was completed over a weekend with no problem. The move went so smoothly that on Monday — when the Storage Rack Division's users came up on the in-house system — it was imperceptible that they had moved from the Xerox data center in Los Angeles to their own in-house system at Warren, Ohio."

The Republic Manufacturing Group is now proceeding to put other divisions and subsidiaries on the Xerox system. The applications used by the Manufacturing Group are general ledger, order management, cost planning and control, MRP, master production scheduling, production control, physical inventory, payroll and accounts payable.

Cost Reduction

Although the task force said it would cost $8 million and take five years to develop an in-house system, by purchasing the Xerox Manufacturing System the software cost was reduced to a fraction of the $8 million, and the time to install all three divisions was cut in half, according to Jensen.

"If we had tried to develop a total system ourselves, we would have found ourselves designing a system for each division. That would have demanded constant maintenance. In fact, with our old system we were averaging between 15 and 20 calls a week for maintenance. Now we get between one and two calls every week. As you might expect, most of those calls are related to scheduling reports and print jobs."

Also, with the Xerox Manufacturing System's on-line capability and ease of access to date, Republic can extract information quickly where it used to take two weeks.

Manufacturing Impact

"This system has certainly improved our manufacturing operations. We now have immediate control over inventories and the first opportunity for us truly to schedule a shop. Once control was established, we saw an immediate drop in inventory and an improvement in productivity," Jensen said.

"The Xerox system also provides us with additional data not previously available and provides it on a very timely basis. We plan to provide a weekly financial rundown on each division and subsidiary. Since all of the applications are installed and integrated, financial reporting becomes a result of everyday transactions," he added.

The group utilizes another Xerox system option, the Reporter. It is a management display tool that enables a user to fashion custom report formats according to specific data needs.

Turnaround Document

"It's a turnaround document," Jensen said, "that enables the group to reconcile inventory within 24 hours of completion, as opposed to two weeks in the past. Another report made possible by the Reporter, a dispatch list, lets foremen schedule a unit to meet promised deliveries. It also assists in manpower planning."

"We totally streamlined the division's operations. I think that the experience of the training sessions and installing a major computer system made all personnel more aware of facets of the business outside their own normal functions. It tuned everybody into the objectives of the division," Richard McGauran, materials manager of the Storage Disk Division, said.

"In a nutshell, the Xerox system was the only software on the market that did everything we needed. Some of the other systems we had evaluated had different connecting applications, but none offered an entire manufacturing and financial package that revolved around general ledger — the bottom line of any company — as the Xerox system does. The tools were there to do everything we wanted. And then some," Robert S. Collier, group sytems manager, said.

VAX SOFTWARE!

PACS™ with EZLOG™ is today's standard in:

Resource Accounting
Performance Monitoring
Internal/External Billing
Project-Based Accounting

PACS has been accepted into Digital's EAS Library.

Signal Technology, Inc.
5951 Encina Rd., Goleta, California 93117 (805) 683-3771
Outside California Call Toll Free (800) 235-5787

VAX is a registered trademark of Digital Equipment Corporation

DECsystem-10/20 Users...

Mainframe Modeling at a Micro Price

- BBL II+ is a true decision support language, not a spreadsheet package
- Self-documenting models that look and read like English
- Easy to learn and use, yet incredibly powerful
- Delivered with superior documentation — installs in minutes
- BBL II+ "Starter Kits" cost just $95, including complete BBL II+ documentation, the BBL II+ application library and a 90-day trial copy of the BBL II+ system

If you *own or use* any standard DECsystem-10 or DECSYSTEM-20, you can finally get the mainframe modeling system you need, at a price you can afford... just $2950! Prove it for yourself with a BBL II+ "Starter Kit". Call or write today for complete details.

BBL II+ Available Now... Just $2950.00

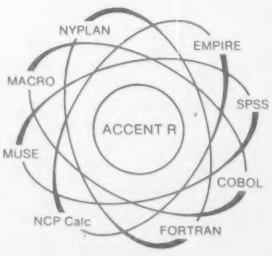
DECsystem-10 & DECSYSTEM-20 are trademarks of Digital Equipment Corporation

BBL II+ Core & Code, Inc.
3 Winding River Circle, Wellesley, MA 02181
(617) 237-4554

Move into the future with ACCENT R

the nucleus of your decision support system!

Visit us at
DEXPO™ East 83
Kiel Auditorium
St. Louis, Missouri
May 22-24, 1983
Booth 631



ACCENT R, the 4th generation language for **DEC 10's and 20's** has a new dimension...

Interfaces to statistical analyses, spread sheets, graphics, word processing, COBOL, FORTRAN, MACRO, and more.

For more information send to: 20370 Town Center Lane, #130, Cupertino, CA 95014 **(408) 257-7700**

NATIONAL INFORMATION SYSTEMS, INC.

Name _____
Company _____
Address _____
CPU _____ Phone _____

Firm Finds Control Systems Need Business Plan

By Walter Gartman
Special to CW‡

SHEBOYGAN, Wis. — The Vollrath Co. here installed an informal but computer-related shop control system in the early 1960s. Known as the Integrated Manufacturing Information and Control (Imiac) System, it was the traditional reorder point system — a stand-alone style driven by an exponentially smoothed forecast with most emphasis on shop floor control.

The "Manufacturing System" in the system's name emphasized that all of the problems were manufacturing-related — manufacturing that takes place on the shop floor. In the process of installing Imiac, timekeepers and order-posting clerks were supplanted by an IBM 357 which — with its punch cards and badge readers — created an output card used for order tracking, payroll processing and some job tracking.

But in this informal environment, unlinked to any other computer-generated system within Vollrath and without the essential feed of an overall business plan, all Imiac did was discover mistakes sooner.

As more manufacturing facilities, products and demands were added over the next 15 years, this informal shop floor control was patched and extended in Band-Aid fashion, making existing systems inadequate and complex and leading to a kind of decay.

Overhaul Time

By 1979, it became clear that it was time to overhaul the manufacturing systems and replace them with state-of-the-art applications. Vollrath's current formal shop floor control system is part of the development of Closed Loop Accountability Management Planning System (Clamps). Clamps links all integrated management planning systems: business planning, marketing and manufacturing planning, master scheduling and materials requirements planning. These are prerequisite to and set the pace and priority objectives for shop floor control, ensuring both proper foresight and feedback.

This interaction of all computer-assisted facets of planning and manufacturing ultimately allows Vollrath plant supervision to work through a sensible, paced and practical schedule. As a result, shop floor schedulers and expediters have been taken off the floor and reassigned. The responsibility for meeting due dates is in the hands of the supervisors.

In its on-line, real-time interfacing with master production scheduling (MPS) and material requirements planning (MRP), the shop floor control system also serves payroll and supplies accounting with up-to-date transactions with burden applications.

It updates inventory accounting with current requisitions and receipts and gives exact status of any production order as of the last transaction.

Real Issue

But this interface of the total computer-aided Vollrath systems (particularly the integration of shop floor control) did not just happen. It involved great labor, trauma, planning, mistakes, doubts, time, money, patience and, above all, a project team with the commitment of top management.

Managing change was the real issue. So from the beginning, education was as important as the systems development itself.

Intrinsic to interfacing shop floor control systems with other computer-aided management systems was the formation of the best possible project team. The team had to be able to anticipate potential problems down the road and be committed to accuracy and a realistic timetable. Even more important was the commitment to educate Vollrath's work force, realizing that they face not only technical changes but also

(Continued on Page 70)

Guide Indexes DP Publications

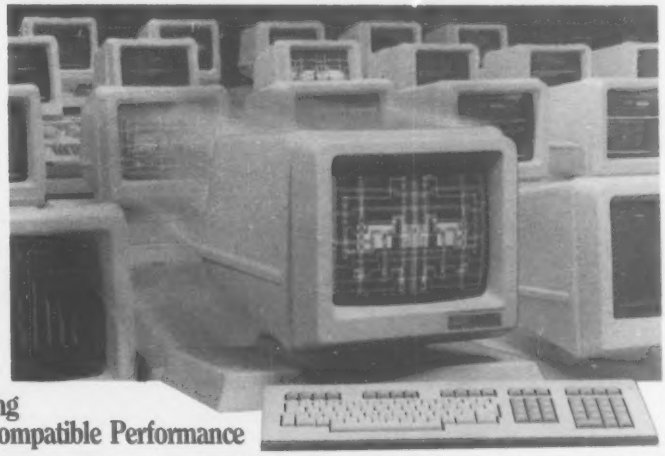
PHOENIX — Applied Computer Research, Inc. has announced the availability of the "1982 Cumulation of the Computer Literature Index." The 313-page reference source is a guide to the literature in the computer field published during 1982.

Covering nearly 200 periodicals and many DP-related books and conference reports, the index focuses on material pertaining to the practicing end of the DP profession as opposed to the theoretical or engineering side.

The subject-indexed guide features electronic data processing administration, applications of computer systems, communications, the computer industry, technology, personnel and training, equipment selection, software and programming, systems analysis and DP techniques, the publisher said.

With more than 200 subject classifications, the quarterly publication is available on a subscription basis for $95/year. Nonsubscribers can buy the single, cumulative issue for $35 through P.O. Box 9280, Phoenix, Ariz. 85068.

Pass the ISC™ 8301 Screen Test with Flying Colors



Stunning Plug Compatible Performance

MPC's 2100 is a high performance color graphics terminal completely emulating the ISC™ 8301 G and H. The 2150 includes the advantages of a high resolution bit map to emulate the ISC™ 8301 R. Both are completely compatible with commands from PLOT-10™, IGS™ and ISSCO™ graphics software.

Loaded with built-in extras, MPC's alternatives are today's most heavily featured smart video display terminals. Eight colors distributed over three planes give the 2100/2150 Series a remarkable depth of patterns and intensities. Self-convergent, in line color guns assure high resolution graphics free of periodic adjustments.

Available Now!!!

Why wait through long factory lead times? Your local MPC distributor can deliver MPC 2100/2150 ISC™ plug compatible graphics terminals, loaded with extras, from stock today.

A worldwide distribution network provides sales and service for the MPC family of sophisticated CRT terminals. Call (703) 430-1800 for the name of your nearest distributor.

You'll See Built-in Extras at No Extra Cost!

MPC's 2100/2150 Series brings you the costly options of other terminals as standard features. Take a closer look at the extras in MPC's new generation of engineering excellence:

- **Eight Color High Resolution Display:** Smart editing terminal for color graphics and alphanumeric needs:
- **Self Convergent, In-Line Color Guns**
- **Twenty-four Programmable Function Keys,** plus a programmable numeric keypad store up to 36 individual function sequences in NVR.
- **Double High, Double Wide Character Capability**
- **480 x 384 Readable bit map (MPC 2150)**
- **Eight Pages of Video Memory**
- **24 or 48 Lines**
- **Enhanced Scrolling**
- **Selectable Video Attributes** and adjustable brightness controlled from keyboard.
- **Two RS-232 Ports**—bidirectional and independently controlled
- **14" Non-Glare Screen**
- **Detachable Keyboard** meets European DIN specs
- **Soft Set-Up + Host Configurable**
- **UL Listed, FCC & CSA Approved**

Ergonomics: All MPC terminals offer an enlarged non-glare screen and adjust to individual preferences by rotating 60° in either direction or by tilting up to 15°. The low profile, detachable keyboard meets new European DIN specifications.

■ **Kierulff Electronics:** Call your Kierulff Division, (outside Calif. 800-338-8811) ■ **Computer Peripherals,** Richardson, TX (214) 644-3606 ■ **Digital Solutions,** Marietta, GA (404) 955-4488 ■ **Dayton-Forrester Associates,** Canoga Park, CA (213) 701-0127 ■ **Procom Sales,** Elk Grove, IL (312) 860-1028 ■ **The Tricom Group,** Hicksville, NY (516) 681-1222 ■ **Mid-Com Communications Inc:** Southfield, MI (313) 353-5696 ■ **Computer Dataco:** Kansas City, MO (816) 221-1212 ■ **Peripheral Business Systems,** Kirkland, WA (206) 823-6661 ■ **Peripheral Equipment,** Pleasant Grove, UT (801) 785-5009 ■ **Dynamic Systems North West,** Mukilteo, WA (206) 745-5311 ■ **RC Data,** San Jose, CA (408) 946-3800 ■ **Trans Alaska Data Systems,** Anchorage, AK (907) 561-1776 ■ **Andor Systems,** Ontario, Canada (416) 746-2775

a division of C3 Inc.

MPC

Micro Products Company
Rte 634 & Acacia Lane
Post Office Box 198
Sterling, Virginia 22170
Telex: 901755
Phone: (703) 430-1800

C3 Inc.
Kingewick House
Summinghill, Berkshire
England SL57BJ
Telex: (851) 848980
Ph: Asset (C990) 23491

UNLEASH YOUR DEC-20s

Introducing Digital's System Interconnect Architecture. A unique way to link mainframes so users can simultaneously share all processing and storage resources.

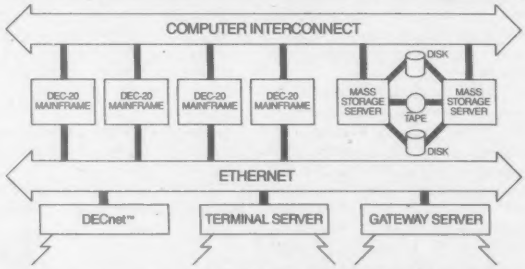
DSIA gives you the power of multiprocessing and the convenience of distributed networking. It lets you create a single virtual file system for complete data control. It increases CPU performance by off-loading tasks to intelligent outlying peripherals. Best of all, it allows you to add or subtract computing and storage resources independently of one another.

Whenever and wherever you need them.

It's the flexibility in system design you've been waiting for.

ANNOUNCING
THE END OF INFORMATION ISOLATION.

Now you can loosely couple up to four DECSYSTEM-20s™ through a 70 Mb/sec hardware bus. Put our new intelligent mass storage server on the bus. The Common File System,



an extension to the TOPS-20™ operating system, takes over file management tasks. The information on up to hundreds of disk and tape subsystems* becomes available at any terminal, through any host. You don't need duplicate files

BY TYING THEM TOGETHER

so you save both space and money. Redundant data paths protect against lost information. And all data access is transparent to the user.

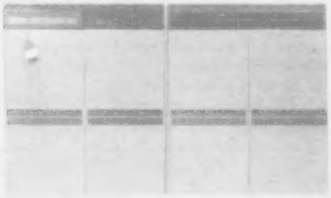
Soon TOPS-20 will be extended further. To intelligent communications servers that will off-load communications tasks from the hosts. This will allow multiple DECSYSTEM-20s to be linked to local area networks, remote DECnet™ networks and foreign networks beyond. In any combination.

THE INDUSTRY'S FIRST LONG-TERM COMPUTING STRATEGY.

With DSIA, you can build a network with independent computing, storage and communications modules. Each does what it does best. And collectively they perform like a single multiprocessing system. Without the hardware restrictions that limit traditional multiprocessing schemes. Or the performance trade-offs associated with conventional networking.

So as system manager you can spend your time deciding what needs to be done. Little time figuring out how. And no time asking if. At the same time, you'll enjoy lower maintenance, less operational overhead and simplified system control.

Digital's System Interconnect Architecture. It's the industry's first long-term computing strategy because it sets the system designer free.

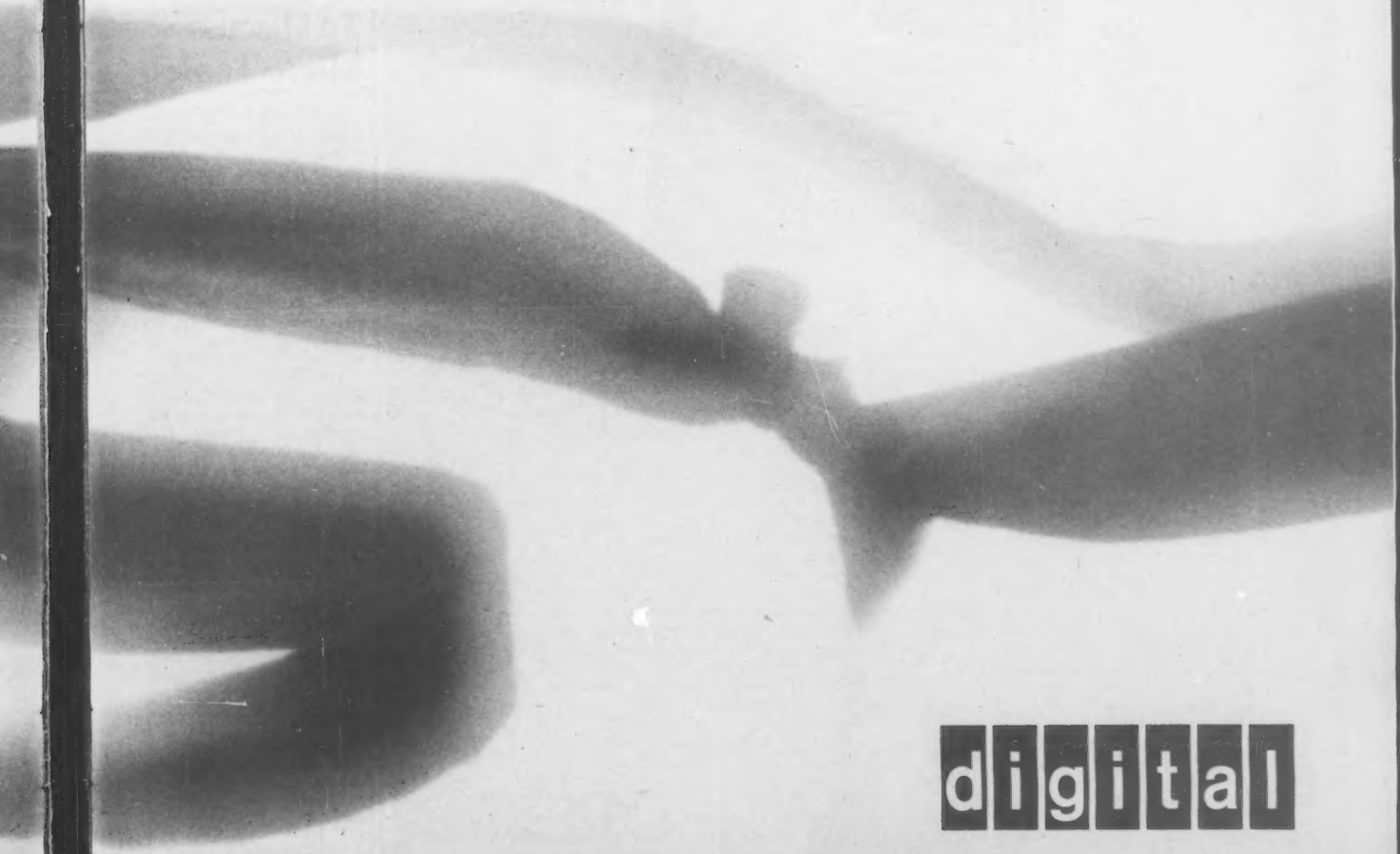


Find out more.

Digital Equipment Corporation, Large Computer Group, MR2-2/8D2, One Iron Way, Marlboro, MA 01752. Tel 1-800-DIGITAL
European Headquarters: 12 Av. des Morgines, CH-1213 Petit-Lancy/Geneva.
International Headquarters:
100 Nagog Park, Acton, MA 01720 U.S.A.

*Our RA60 and RA81 disk and TA78 tape drives presently supported.

© Digital Equipment Corporation 1983



digital

Firm Finds Control Systems Need Business Plan

(Continued from Page 67)
deep social changes.

Once the team had been assembled preliminary research began. First, a realistic assessment of in-house needs was made. Personal interviews were found to be most effective. Second, the approaches of other successful systems were studied.

A close examination of other in-house computer-aided management systems was the third step carried out. In other words, was the proposed plan going to be compatible with Vollrath's existing systems? Finally, recommendations based on the above three items were needed. A decision had to be made: Should the project continue or should it be killed?

Design Finalized

If the project was to be continued, systems design had to be finalized with the systems analyst serving as liaison between the project staff and the DP department programmers.

At this point the project team was split. The systems people on the team took care of technical development. The project leader went into preeducation development. This meant preparing study materials for people at all levels, including samples of what reports would come off the computer, directions on how to use reports and an explanation of the logic of the systems development. The plan was fine-tuned with the help of the supervisors.

At this point it should be kept in mind that one of the major reasons such projects never get completed is that there are too many detours. The team had to make logical changes but could not tinker forever.

Final Step

The final step in the project was the organization of an interface to serve labor and management. In a union shop there are the considerations of early involvement of union leaders and upfront orientation of these representatives. But even in a nonunion situation there must be early involvement of both management and the work force.

An open discussion of the project with shop spokesmen or union management will help dispel lingering fears that the company is trying to "pull something off."

Once the conversion to the new system is made, problems will arise; they should be expected. At Vollrath, three months of reexamination and problem-solving were necessary to bring people as well as technology on-line.

Gartman is corporate director of materials management for the Vollrath Co.

SUPPORT THIS UNION
AND AVOID A WORK SLOWDOWN.

Organize your DP operation around a VAX computer and Direct 831 terminals and enjoy an important benefit of a DEC-Direct union. More power. The kind that gets work done faster.

To the 831's VT100-compatible features you can add an optional integral modem to put the power of your VAX in the hands of anyone with a telephone.

Or add PLOT 10 graphics and deliver the big picture when there's no time to wade through words.

But that's just for starters.

The 831's block mode frees your VAX from the chore of creating and editing data. (That's why many users, including DEC itself, view block mode as an answer for overburdened CPUs.)

And if that's not enough, you can unite host and personal processing by field-upgrading the 831 to our Direct 1031, a self-contained terminal/personal computer. The 1031 makes the entire array of CP/M-compatible software available to off-load your host, leaving you more VAX processing power for the jobs only a VAX can handle.

To further our cause, we're prepared to stage a demonstration at your place of business. Contact us at Direct, Inc., 4201 Burton Drive, Santa Clara, CA 95054. Telephone 800-538-8404 (408-980-1414 in California). Direct and DEC. It's one union that gives you more than you bargained for.

DIRECT

DEC, VAX, and VT100 are registered trademarks of Digital Equipment Corporation. CP/M is a registered trademark of Digital Research, Inc. ©1982 Direct, Inc.

Meet Slated To Discuss Micro Topics

LAS VEGAS — A Professionals Microcomputer Symposium for future users of small business computers will take place here June 23-25.

Jointly sponsored by Timberline Systems, Inc. and Timberline Users Group, the symposium is being held primarily for accountants who recommend microcomputers to others or are planning to acquire their own systems.

The agenda will include sessions on microcomputers and their operating systems, applications software, productivity tools, "vertical market" vs. general accounting software, data communications, data bases and other topics.

The full registration fee is $290. The exhibits-only fee is $40.

More information on the symposium is available from the symposium coordinator at Timberline Systems, Inc., 7180 S.W. Fir Loop, Portland, Ore. 97223.

'Why Are All Letters Different?'

Calendar

Week of May 29

June 1, New York — **Planning for XA.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

June 1-3, Philadelphia — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 6-8 in Atlanta.

June 1-3, Los Angeles — **Data Base Management Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, New York — **The Personal Computer: Strategies for Managing.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, New York — **Evaluating, Selecting and Using Computer Software Packages.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, San Francisco — **Microcomputer Systems: A Guide to Selection and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, Chicago — **Successful Use of Minicomputers.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, Boston — **Computer Performance Measurement and Capacity Planning.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, Chicago — **Practical Data Security: Implementation and Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 1-3, Columbus, Ohio — **VM Structure, Flow and Tuning.** Contact: Education Coordinator, Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

June 2, Boston and San Francisco — **SNA Trends '83 – The Direction of IBM Communications.** Contact: George Haskell, Communications Solution, 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

June 2-3, Los Angeles — **Local-Area Networks: Selection Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 2-3, New York — **Data Facility Products.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

June 2-5, Diamond Bar, Calif. — **Solving Client Problems.** Contact: Donald J. Bushor, COM Consultants, P.O. Box 4132, Diamond Bar, Calif. 91765.

Week of June 5

June 5-8, Scottsdale, Ariz. — **Data Entry Management Association (Dema) Mini-Conferences and Professional Growth Seminars.** Contact: Marilyn S. Bodek, Dema, P.O. Box 3231, Stamford, Conn. 06905.

June 6-7, Boston — **Digital PABX.** Contact: The American Institute For Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

June 6-7, New York — **Computer Networks: Protocols, Standards and Compatibility.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 6-8, Baltimore — **Fifth Annual National Educational Computing Conference.** Contact: Dr. Doris Lidtke, Department of Mathematics and Computer Science, Towson State University, Baltimore, Md. 21204.

June 6-8, Washington, D.C. — **Data Dictionaries: Concepts, Contents and Uses.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

June 6-8, New York — **CEO Word Processing.** Contact: Data General Corporate Educational Services, 400

(Continued on Page 74)

USENIX

1983 Summer Conference, July 12-15, 1983, Toronto, Canada

The 1983 Summer Conference of the USENIX Association and Software Tools Users Group will be held in Toronto, Canada July 12-15, 1983 at the Harbour Castle Hilton. This announcement provides information about the dates of events, as well as who to contact for further information. A pre-registration packet will be mailed on request including both conference and hotel registration forms.

USENIX Technical Sessions–July 13-15, 1983
Session topics include UNIX* programming tools, networks, graphics, applications, languages, hardware, word processing, etc.
Invited speakers and panel discussions will round out the program.

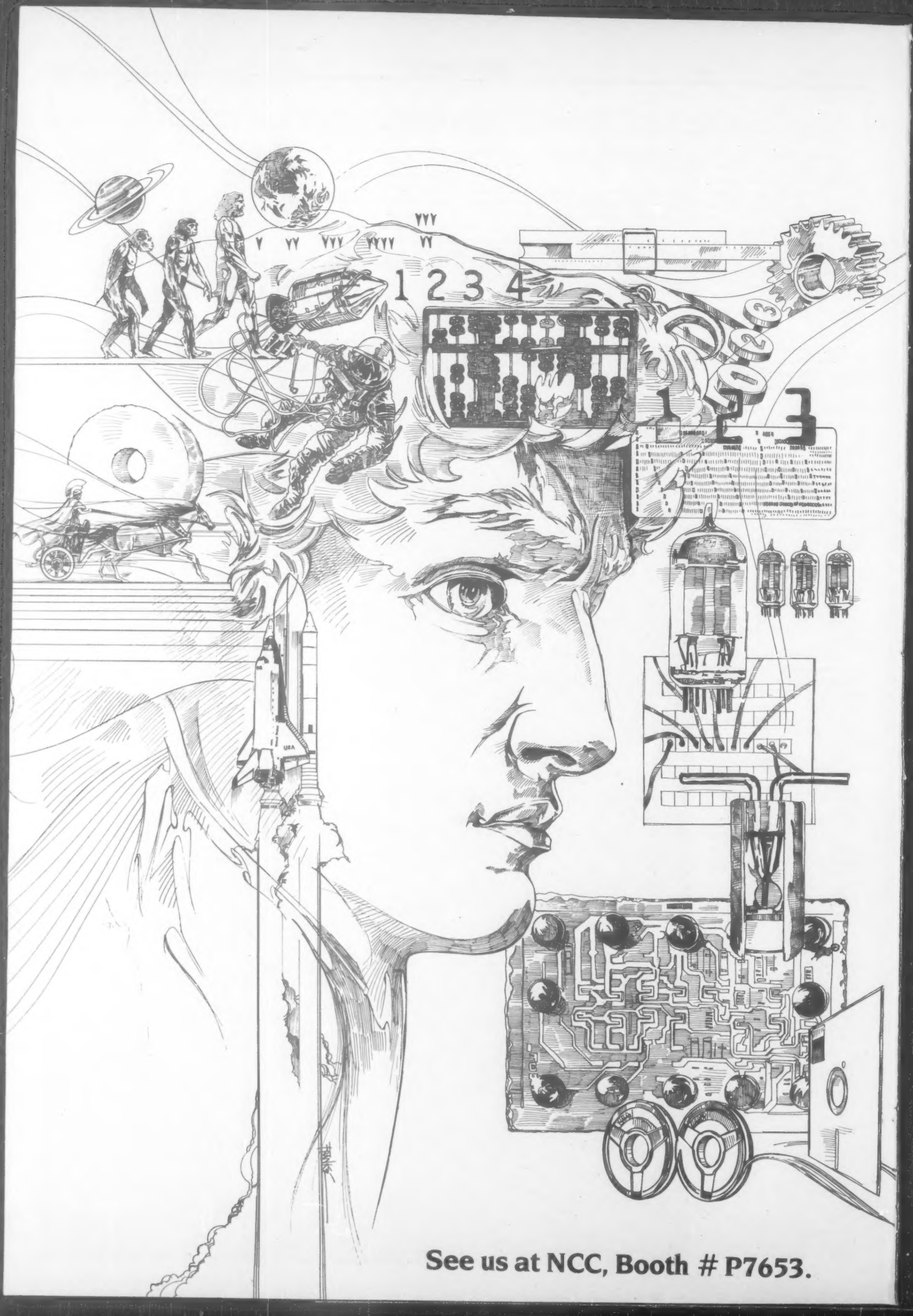
Software Tools Users Group Meeting–July 12, 1983
This meeting's topics will include enhancements, standardization and consolidation of all the various implementations into a compatible system.

UNIX* Tutorials–July 12, 1983
More specific information on Tutorials is included in the pre-registration packet. Past subjects have included introduction to UNIX* text processing and documentation and basics of writing UNIX* Device Drivers and 4.2 BSD.

Vendor Exhibits–July 12-14, 1983
A vendor exhibition will be held at the Harbour Castle Hilton on July 12-14, 1983. The key companies in the UNIX* industry will display new products.

To receive registration or vendor information, contact
Rogal Boston, Inc., 72 Langley Road, Newton Centre, MA 02159
(617) 965-1000

*UNIX is a trademark of Bell Laboratories.



See us at NCC, Booth # P7653.

Introducing the Auragen of the computer species.

Now a higher form of computer technology has evolved. It combines fault tolerance, high performance and ease of use. The natural selection for your business transaction needs.

Now you can have fault tolerant applications at price/performance levels never available before. For under $138,000, our entry level 2-Cluster system provides up to twice the performance of today's fault tolerant systems.

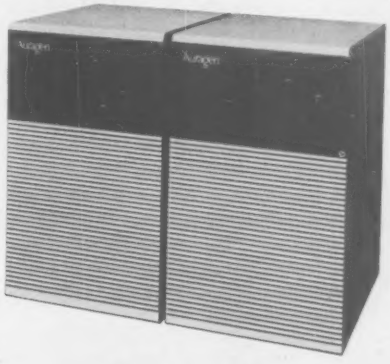
AURAGEN™ begins with an advanced 32-bit distributed architecture. Both your professional and end-user staff will find it easy to learn and use. AUROS,™ our operating system based on UNIX,™ is enhanced with performance, security, privacy and recovery capabilities specifically tailored for the transaction market. We provide ANSI 74 High Level COBOL, FORTRAN 77, Pascal, C and even business BASIC that run fully fault tolerant. No special instructions are necessary. No reprogramming. No retraining. No added expense.

We also provide a full range of interactive productivity tools for programmers, including AURAGEN's full-function relational DBMS and Transaction Processing Management System. Then we've added menus, help facilities, and an English-like query language to make your staff more productive. The extensive communications packages that we provide include SNA, BSC, X.25 and more.

The concept that sets us above and apart from all other fault tolerant systems is simple. Our fault tolerance is totally transparent and is so efficient you'll never want to turn it off. Our backup hardware is available to do productive work during normal operations. No downtime. No manual backup procedures. No added expense.

With AURAGEN's distributed design, you can grow in precisely controlled increments. The basic fault tolerant system contains two Clusters. Each Cluster contains several tightly coupled MC68000 processors. Separate processors handle fault tolerance, user programs, communications, and database functions. The system can be expanded to 32 Clusters.

AURAGEN is so advanced, you'd select our system even if we didn't provide fault tolerance. But we do. In today's competitive business environment, you need every survival factor working for you. We provide them all. And we want to tell you more about them. That's why we invite you to ask for more information.



Auragen Systems Corp.

THE NATURAL SELECTION

AURAGEN Systems Corp. CW516
Two Executive Drive, Fort Lee, N.J. 07024
In New York, (212) 605-0152 Call toll-free 800-847-4276.

I'm interested in the AURAGEN System. Tell me more.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

™AURAGEN and AUROS are registered trademarks of AURAGEN Systems Corp.
™UNIX is a registered trademark of Bell Laboratories.
© 1983 AURAGEN Systems Corp.

Calendar

(Continued from Page 71)
Computer Drive, Westboro, Mass. 01580.

June 6-8, Scottsdale, Ariz. — **Data Entry's Place in the Electronic Office.** Contact: Data Entry Management Association, P.O. Box 3231, Stamford, Conn. 06905.

June 6-8, Anaheim, Calif. — **VAX/VMS Systems.** Contact: Raxco, Inc., Seminar Registrar, Suite 200, 6520 Powers Ferry Road, Atlanta, Ga. 30339.

June 6-8, Houston — **Data Communications Systems.** Contact: Center for Advanced Professional Education, 11928 N. Earlham, Orange, Calif. 92669.

June 6-8, Atlanta — **Data Base Management Systems: Concepts and Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 6-8, Atlanta — **Systems Analysis and Design: Concepts and Effective Practice.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 6-8, New York — **Introduction to Office Automation: Concepts, Technologies and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 6-9, New York — **CICS/VS Logic and Debugging.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024.

June 6-9, Los Angeles — **Structured Systems Design/ Structured Program Design Combined Course.** Contact: Gayle Giesecke, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604. Also being held June 6-10 in Houston.

June 6-10, New York — **CICS/VS Command-Level Programming.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

June 6-10, Washington, D.C. — **Workshop in Data Communication for Microcomputers.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 6-10, Washington, D.C. — **Structured Maintenance.** Contact: Gayle Giesecke, Ken Orr and Associates, Inc., 1752 Gage Blvd., Topeka, Kan. 66604.

June 7-8, Schaumburg, Ill. — **Second Annual Conference on Office Automation: A Management Focus to Improve Productivity.** Contact: Data Communications, Special Projects Conference Management Center, c/o Information Breakthroughs, Inc., 445 W. Main St., Wyckoff, N.J. 07481.

June 7-8, Arlington, Va. — **Erasable Material for Mass Storage Retrieval Applications.** Contact: The International Society for Optical Engineering, P.O. Box 10, Bellingham, Wash. 98227.

June 7-9, College Park, Md. — **Planning for Office Automation.** Contact: University of Maryland, Center for Adult Education, College Park, Md. 20742.

June 7-9, Dallas — **Ada Launch '83 Seminar.** Contact: Steve Goings, Computer Thought Corp., P.O. Box 61028, Dallas, Texas 75261.

June 7-10, Chicago — **Vsam for IMS Programmers.** Contact: Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.

June 7-10, Los Angeles — **Digital Communication.** Contact: Ruth Dordick, Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

June 7-10, San Jose — **Speech Synthesis and Recognition for Voice Input/ Output.** Contact: Ruth Dordick, Integrated Computer Systems, Inc., 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

June 8-9, Arlington, Va. — **Optical Disks Systems and Applications.** Contact: The International Society for Optical Engineering, P.O. Box 10, Bellingham, Wash. 98227.

June 8-10, New York — **Computer Operations Management: Effective Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 8-10, Boston — **De-**

Whisper Writer communicates via phone lines; an RS-232C version is also available.

3M's Whisper Writer. It's like having four machines for the price of one.

- ☐ A teleprinter for TWX and telex.
- ☐ A desktop terminal for communicating with a mainframe computer, DDP network, time-sharing service, or electronic mail network (including 3M's new Whisper Exchange).
- ☐ A means of direct access to any ASCII terminal that has a telephone modem.
- ☐ A portable terminal for all of the applications above.

Best of all, you can enjoy all of this communications flexibility at a price that's less than you'd pay for most single-purpose devices.

Buy only the hardware you need.
In its standard configuration, the Whisper Writer comes with an internal modem, telephone jack, and programmable automatic answering feature. A carrying case with acoustic adapter is optional. An RS-232C interface may be substituted for the modem if desired.

The Whisper Writer's unusually quiet thermal printing mechanism prints sharp, black-on-white characters at 35 cps.

If you wish, you can buy the printer alone for RO applications and upgrade to full Whisper Writer status by buying a plug-in keyboard module later on.

Easy to learn, simple to use.
The separate keyboard module uses the conventional typewriter layout. Additional function keys reduce the need for memorizing special control codes. In applications involving computer access or electronic mail, you can even automate your log-on sequence.

Editing memory lets you prepare text off-line. *Whisper Writer's 4,000-character memory and editing features allow you to get messages and data letter-perfect before you dial. The result: lower phone, TWX, and Telex charges, plus lower connect-time costs and less tying up of communications lines.*

Reliability backed by 3M's national service network.
Whisper Writer's dot-matrix printer has already demonstrated its durability in more than 55,000 home and small business computer systems. Whenever maintenance is required, it's available from the same people who market and service 3M business products nationwide.

Phone 800-328-1684 toll-free or mail the coupon for literature or a demonstration. (In Minnesota, call 800-792-1072.) In Canada, call 1-800-268-9055 and ask for Operator #11.

Mail to: COW 5-16/008
3M Business Communication Products Division
Attn: G. Collins
3M Center – Building 216-2N
St. Paul, MN 55144

☐ Please send me a brochure on 3M's new Whisper Writer.
☐ Call me to arrange a demonstration.

Name
Title
Phone ( )
Company
Address
City State ZIP

Business Communication Products Division

3M hears you...

3M

Calendar

veloping Automated Human Resource Management Systems. Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

June 8-10, Arlington, Va. — **Personal Computers and Networking.** Contact: Herb Stern, Center for Advanced Professional Education, Inc., 11928 N. Earlham, Orange, Calif. 92669.

June 8-10, New Brunswick, N.J. — **Data Communication Systems.** Contact: Center for Advanced Professional Education, 11928 N. Earlham, Orange, Calif. 92669.

June 8-10, Boston — **Fundamentals of Data Communication.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

June 9-10, Arlington, Va. — **Nonerasable Media.** Contact: The International Society for Optical Engineering, P.O. Box 10, Bellingham, Wash. 98227.

June 9-10, Washington, D.C. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

June 9-10, New York — **CEO System Support.** Contact: Data General Corp. Educational Services, 4400 Computer Drive, Westboro, Mass. 01580.

Week of June 12

June 12-16, Salt Lake City, Utah — **Government Management Information Sciences 1983 Conference.** Contact: William Allen Dunn, 151 S. 2100 St., Salt Lake City, Utah 84115.

June 13-14, Chicago — **Data Communications: Advanced Concepts, Products and Services.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-14, Boston — **Local-Area Networks: Selection Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-14, Chicago — **Structured Maintenance: Reducing Costs With a New Methodology.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-15, New York — **Structured Testing: Tools and Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-15, Chicago — **Evaluating Security Software: Choosing the Right Package.** Contact: Computer Security Institute, 43 Boston Post Road, Northborough, Mass. 01532.

June 13-15, Boston — **DP Disaster Recovery Seminar.** Contact: EDP Security, 181 W St., Waltham, Mass. 02154.

June 13-15, Upland, Ind. — **The 16th Annual Association of Small Computer Users in Education Conference.** Contact: Dr. Wally Roth, Department of Information Science, Taylor University, Upland, Ind. 46989.

June 13-15, Dallas — **Introduction to Office Automation: Concepts, Techniques and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

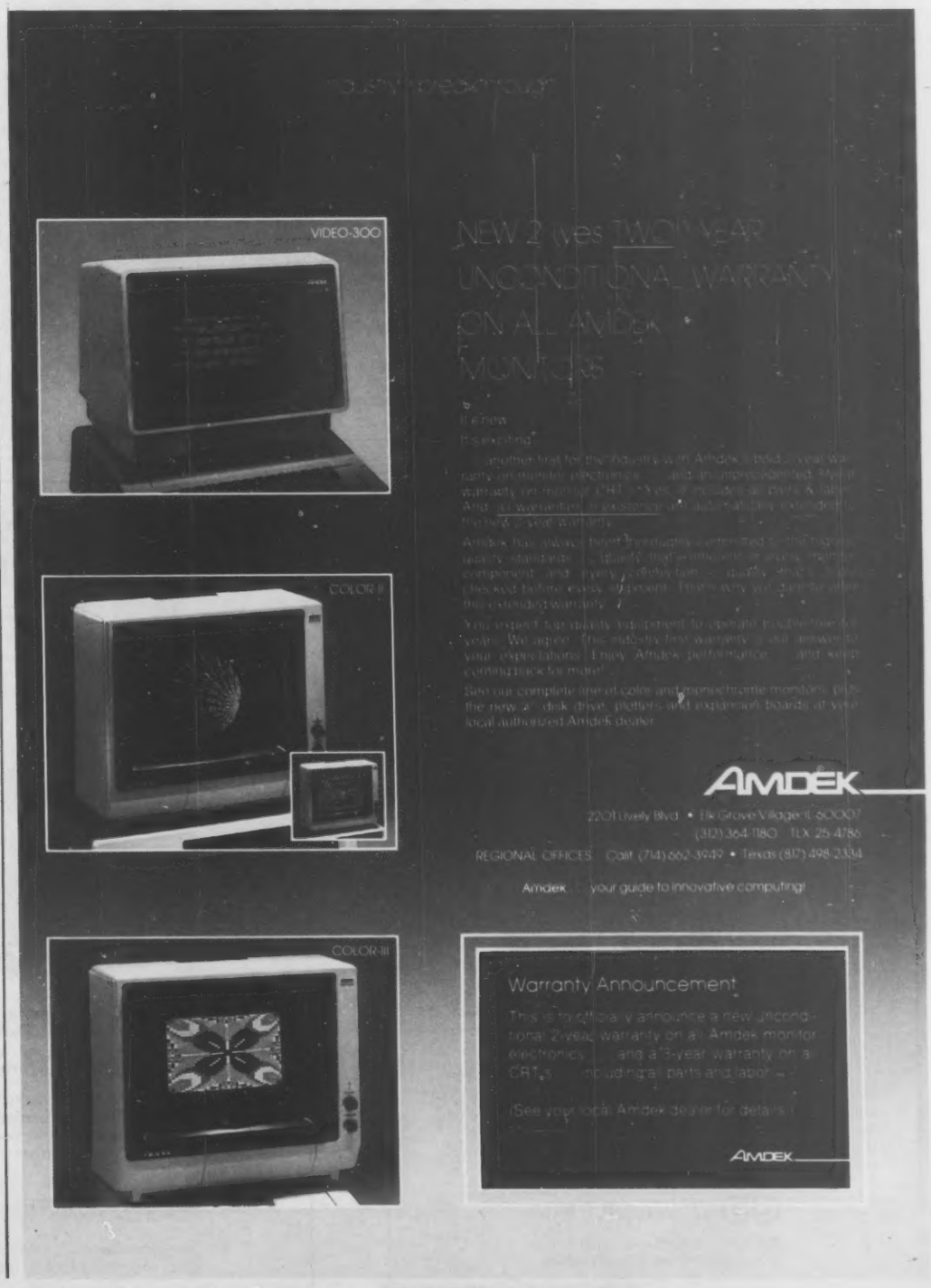
June 13-15, Chicago — **Word Processing Systems: Planning, Design and Operations.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-16, New York — **Vtam: From Start to Finish.** Contact: Dianne Halper, On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

June 12-17, Malibu, Calif. — **Computer: The University Computer Challenge.** Contact: Summer Computer Literacy Institute, Pepperdine University, Malibu, Calif. 90265.

June 14-17, San Diego — **Local-Area Networks.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

June 14-18, Paris — **Micro Expo '83.** Contact: Christine Mullings, Sybex, 4 Place Felix-Eboue, 75583, Paris, France.



SEE US AT NCC/83 BOOTH P7638

Users Rate Magnuson Systems First, CDC Last

(Continued from Page 1)

NCR Corp., Burroughs Corp., Sperry Corp. and Honeywell claimed the seventh, eighth, ninth and tenth spots in terms of user satisfaction, respectively.

The highest rated IBM systems, according to this year's ratings, were those in the 3080 series, which ran fifth behind Magnuson's M80, DEC's Decsystem-20, Amdahl's 470 and the Decsystem-10. IBM's 360s and 370s, along with its 3033, 4341, 4331, 3031 and 3032, were scattered throughout the middle of the user satisfaction list, with the 8100 finishing last.

Despite its extremely weak showing, 85% of the 8100 users told Datapro they have no intention of trading in their systems for those of another vendor over the next year. Only 7% plan to replace their systems with one made by another vendor; the rest said they will wait for upgrades from IBM.

Likewise, a high percentage of 4341, 4331, 3033 and 3080 users have no immediate plans to swap their systems for machines made by IBM competitors. However, 43% of the 370 users, 28% of the 3031 and 3032 users and 20% of the 360 users polled said they will trade in their systems for more powerful IBM replacements sometime within the next year.

Some of the major reasons why CDC broke Honeywell's three-year stranglehold on last place was the difficulty its users had in programming and operating their systems, the Datapro survey said. CDC placed last in those two categories.

Curiously, despite their programming and operating difficulties, these same users said they have no intention of replacing their systems with those made by the competition.

The users even gave CDC a vote of confidence by unanimously agreeing the vendor had delivered all the necessary software on time, tying both IPL and Magnuson for that distinction.

Important Questions

Two vital questions posed to users in the survey were "Did the system do what you expected it to do?" and "Would you recommend it to another user?" A little more than 91% said their systems did live up to their expectations, 4% reported their systems fell somewhat short of what they had expected and 5% said they "hadn't decided."

Comparing individual vendors against each other on this question, IPL, NAS, Amdahl and Magnuson swept top honors with 100%, 100%, 98% and 95%, respectively, of their users saying their systems did what they expected them to do.

In answer to whether they would recommend their systems to other users, 80% of the respondents said yes. However, the only group of users that unanimously said they would endorse their vendor's systems to other users was IPL. The two firms with the second and third highest number of endorsements were Amdahl (96%) and Magnuson (89%).

Asked to identify their major applications, this year's participants identified the same top six applications as last year's respondents — accounting/billing, payroll/personnel, order processing/inventory control, sales/distribution, purchasing and manufacturing.

Insurance moved up to tenth place, replacing education.

The vast majority of users reported that their primary source of software was in-house personnel. Most users said they prefer generating software in-house because they can better tailor it to meet a specific customer's needs.

Most Systems Purchased

While the majority of users reported that they purchased their systems, a healthy number of lessees were also represented in this year's survey. The processor with the widest discrepancy between the number of machines purchased and leased is IBM's 360; 90% of its users have purchased their systems and 10% are leasing them.

The only other two IBM systems where 50% or more users have purchased their systems are the 370 (51.5%, with 38% leasing from third parties) and the 3080 series (50.9%, with 30.7% leasing from third parties).

Asked whether their systems are located in either a centralized or distributed processing environment, the overwhelming majority of users said their systems are central processing installations. The only system used more as a distributed processor than as a central processor is IBM's 8100.

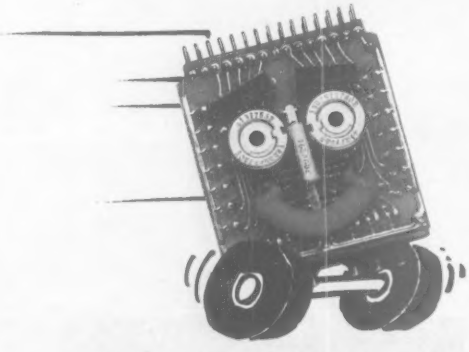
How Datapro Reached Results

DELRAN, N.J. — The results of Datapro Research Corp.'s 1983 survey of computer systems are based on returns from a mailing of 15,033 questionnaires sent to a cross-section of *Computerworld* readers. Users were asked to rate their mainframes and minicomputers in 14 different categories.

Of the 15,015 questionnaires sent out, 4,329 responses were received from 4,103 respondents, a return rate of 27%. Datapro judged 511 of the 4,329 returns invalid, leaving a total of 3,818 vaild responses from 3,592 users with a total of 4,957 installed systems.

Copies of the "1983 User Rating of Computer Systems" can be obtained for $25 from Datapro at 1805 Underwood Ave., Delran, N.J. 08075.

WHEN YOUR COMPUTER'S DOWN AND OUT, WE'LL GET IT UP AND RUNNING. FAST.



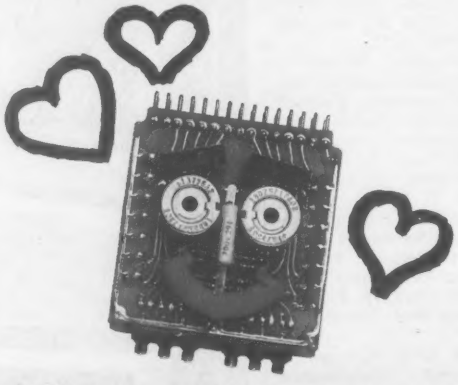
CALL CONTROL DATA.
800/328-3980
IN MINNESOTA 612/931-3131

Nothing cuts downtime better than a responsive, results-oriented customer service organization—one committed to keeping your equipment in excellent condition. It's just what you'd expect from the largest independent supplier of computer peripherals in the world. Call us.

CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities

WITH A LITTLE TLC, WE MAKE SURE YOUR IBM RUNS A-OK.



CALL CONTROL DATA.
800/328-3980

When it comes to single-source maintenance for IBM mainframes and plug-compatible equipment, we wrote the book. We offer a variety of maintenance plans tailored to your needs. Call us anytime—24 hours a day, 7 days a week. We won't let you down.

CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities

COMPUTERWORLD

Users Rate Their Mainframes . . .

Survey Item \ Manufacturer and Model	Amdahl 470 Series	Burroughs B 2500, B 3800, & B 4800	Burroughs B 2900 & B3900	Burroughs B 5900 & B6900	Burroughs B 6700 & B7700	Burroughs B 6800 & B7800	Control Data All Models	Digital Equipment DECsystem—10
No. of User Responses	46	26	27	9	8	20	6	14
No. of Systems Represented	83	34	37	9	15	35	9	20
Avg. Life of System (Mos.)	36.5	50.6	25.4	24.0	85.3	45.0	49.7	64.5
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	15.22	15.38	7.41	0.00	12.50	15.79	0.00	14.29
Yes, Vendor Unknown	17.39	7.69	0.00	0.00	25.00	0.00	0.00	0.00
Yes, Different vendor	2.17	0.00	0.00	0.00	0.00	10.53	0.00	0.00
No	65.22	76.93	92.59	100.00	62.50	73.68	100.00	85.71
Significant Advantages (%)								
Users are happy with response time	71.74	42.31	44.44	33.33	75.00	35.00	33.33	85.71
System is easy to expand/reconfigure	43.48	73.08	74.07	100.00	62.50	65.00	50.00	85.71
System costs were less than expected	23.91	7.69	7.40	0.00	0.00	15.00	0.00	7.14
Programs/data carried over from other systems are compatible, as vendor promised	73.91	50.00	55.56	44.44	50.00	45.00	50.00	50.00
Terminals/peripherals carried over from other systems are compatible, as vendor promised	69.57	50.00	51.85	44.44	12.50	40.00	16.67	35.71
System is power/energy efficient	41.30	7.69	48.15	33.33	0.00	15.00	16.67	7.14
Productivity aids help us keep programming costs down	26.09	34.62	29.63	44.44	25.00	30.00	0.00	28.57
Data base language is efficient and effective	23.91	7.69	22.22	44.44	75.00	85.00	0.00	35.71
Delivery and/or installation of equipment was ahead of schedule	36.96	11.54	22.22	11.11	0.00	5.00	0.00	14.29
Delivery of required software was ahead of schedule	17.39	7.69	18.52	11.11	0.00	5.00	0.00	0.00
Significant Problems (%)								
Computer proposed by vendor was too small	4.35	7.69	0.00	11.11	12.50	20.00	0.00	7.14
Installation of equipment was late	2.17	38.46	37.04	11.11	0.00	35.00	0.00	7.14
Delivery of required software was late	2.17	15.38	14.81	0.00	12.50	10.00	0.00	21.43
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	6.52	11.54	14.81	22.22	25.00	5.00	0.00	7.14
Vendor did not provide all the promised software or support	4.35	23.08	11.11	33.33	12.50	15.00	0.00	14.29
Program/data compatibility not what vendor promised	0.00	3.85	0.00	11.11	12.50	5.00	0.00	0.00
Terminals/peripherals compatibility not what vendor promised	2.17	0.00	0.00	0.00	12.50	0.00	0.00	0.00
Vendor enhancements/changes to hardware/ software hard to keep up with	4.35	26.92	11.11	33.33	25.00	15.00	16.67	7.14
Equipment is excessively noisy	4.35	3.85	7.40	0.00	25.00	5.00	16.67	14.29
Power and/or cooling requirements are excessive	8.70	7.69	0.00	0.00	62.50	25.00	50.00	21.43
System Ratings (4.0-1.0)								
Ease of Operation	3.37	3.80	3.56	3.33	3.63	3.50	2.83	3.77
Reliability of Mainframe	3.57	3.54	3.35	3.33	3.25	2.90	3.33	3.43
Reliability of Peripherals	3.17	2.96	3.00	2.75	2.63	2.63	3.00	2.93
Maintenance Service:								
Responsiveness	3.41	2.96	3.19	2.89	2.88	2.68	3.33	3.17
Effectiveness	3.41	2.56	3.08	2.78	2.75	2.32	3.00	3.17
Technical Support:								
Trouble-shooting	3.40	2.12	2.41	2.78	2.63	2.26	2.83	2.50
Education	2.95	2.17	2.27	2.33	2.63	2.10	2.67	2.73
Documentation	2.92	1.88	2.15	2.00	2.25	1.85	3.00	2.58
Manufacturer's Software:								
Operating System	3.11	3.65	3.56	3.44	3.63	3.42	2.83	3.71
Compilers & Assemblers	3.13	3.15	3.15	3.25	3.38	3.11	3.17	3.14
Applications Programs	2.87	2.55	2.80	2.71	2.20	2.59	2.25	2.78
Ease of Programming	3.00	3.27	3.19	3.11	3.25	3.25	2.83	3.69
Ease of Conversion	3.09	3.08	3.15	2.78	3.00	3.11	2.83	3.00
Overall Satisfaction	3.31	3.00	3.22	3.11	3.00	2.80	2.83	3.29
Did the system do what you expected it to do? (%)								
Yes	97.78	96.15	88.89	33.33	87.50	80.00	83.33	92.86
No	0.00	3.85	3.70	22.22	12.50	15.00	0.00	7.14
Haven't decided	2.22	0.00	7.41	44.44	0.00	5.00	16.67	0.00
Would you recommend system to another user? (%)								
Yes	95.56	88.46	77.78	55.56	75.00	65.00	66.67	83.33
No	2.22	3.85	3.70	0.00	25.00	15.00	33.33	8.33
Haven't decided	2.22	7.69	18.52	44.44	0.00	20.00	0.00	8.33

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

Survey Item \ Manufacturer and Model	Digital Equipment DECSYSTEM—20	Honeywell Level 62 & 64	Honeywell Level 66 & 68	Honeywell DPS 7 & DPS 8	IBM System/360	IBM System/370	IBM 8100	IBM 4331
No. of User Responses	24	39	25	17	10	126	15	171
No. of Systems Represented	36	41	34	25	14	165	22	181
Avg. Life of System (Mos.)	54.4	66.5	60.2	29.9	103.2	82.7	31.3	33.7
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	0.00	10.53	8.00	0.00	20.00	43.65	7.14	14.12
Yes, Vendor Unknown	0.00	10.53	4.00	0.00	40.00	6.35	7.14	1.76
Yes, Different vendor	4.17	18.42	8.00	5.88	0.00	2.38	0.00	0.59
No	95.83	60.53	80.00	94.12	40.00	47.62	85.71	83.53
Significant Advantages (%)								
Users are happy with response time	45.83	48.72	60.00	58.82	20.00	33.33	26.67	55.56
System is easy to expand/reconfigure	62.50	43.59	60.00	82.35	30.00	22.22	46.67	55.56
System costs were less than expected	12.50	5.13	12.00	0.00	10.00	15.08	0.00	19.30
Programs/data carried over from other systems are compatible, as vendor promised	20.83	35.90	20.00	41.18	40.00	47.62	13.33	49.71
Terminals/peripherals carried over from other systems are compatible, as vendor promised	33.33	5.13	12.00	35.29	10.00	39.68	26.67	32.75
System is power/energy efficient	20.83	10.26	12.00	35.29	10.00	2.38	6.67	55.56
Productivity aids help us keep programming costs down	54.17	23.08	24.00	29.41	0.00	17.46	20.00	27.49
Data base language is efficient and effective	29.17	0.00	48.00	64.71	0.00	11.90	13.33	7.02
Delivery and/or installation of equipment was ahead of schedule	16.67	5.13	4.00	23.53	0.00	14.29	20.00	21.64
Delivery of required software was ahead of schedule	8.33	0.00	8.00	11.76	0.00	7.94	6.67	14.62
Significant Problems (%)								
Computer proposed by vendor was too small	16.67	15.38	20.00	5.88	0.00	3.17	6.67	11.70
Installation of equipment was late	8.33	20.51	4.00	17.65	0.00	0.79	33.33	4.68
Delivery of required software was late	12.50	12.82	16.00	17.65	10.00	3.97	20.00	5.85
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	8.33	25.64	12.00	29.41	10.00	10.32	13.33	11.11
Vendor did not provide all the promised software or support	8.33	23.08	32.00	23.53	30.00	1.59	26.67	8.77
Program/data compatibility not what vendor promised	4.17	2.56	8.00	5.88	10.00	0.00	6.67	4.09
Terminals/peripherals compatibility not what vendor promised	0.00	2.56	4.00	5.88	0.00	0.79	6.67	2.34
Vendor enhancements/changes to hardware/ software hard to keep up with	8.33	7.69	24.00	11.76	10.00	7.14	40.00	21.05
Equipment is excessively noisy	20.83	15.38	8.00	5.88	0.00	4.76	0.00	0.58
Power and/or cooling requirements are excessive	12.50	15.38	4.00	11.76	40.00	37.30	0.00	2.34
System Ratings (4.0-1.0)								
Ease of Operation	3.71	3.18	3.16	3.00	3.00	3.09	2.73	3.13
Reliability of Mainframe	3.42	3.28	3.24	3.35	3.10	3.33	3.36	3.78
Reliability of Peripherals	2.96	3.00	2.92	2.88	2.70	3.05	3.00	3.40
Maintenance Service:								
Responsiveness	3.09	3.13	3.16	3.29	3.20	3.19	3.00	3.45
Effectiveness	2.96	3.05	3.04	3.00	3.11	3.13	2.67	3.40
Technical Support:								
Trouble-shooting	2.65	2.51	2.72	2.82	2.86	2.74	2.47	2.88
Education	2.39	2.18	2.68	2.65	2.71	2.64	2.13	2.66
Documentation	2.74	2.11	2.60	2.47	2.50	2.67	2.47	2.67
Manufacturer's Software:								
Operating System	3.58	3.05	3.40	3.41	3.00	2.99	2.67	3.08
Compilers & Assemblers	3.13	3.11	3.28	3.18	3.10	3.18	2.67	3.26
Applications Programs	2.75	2.06	2.78	2.36	3.00	2.81	2.77	2.91
Ease of Programming	3.43	2.90	3.08	3.06	3.20	2.96	2.62	2.98
Ease of Conversion	3.05	2.46	2.61	2.94	3.00	2.95	2.42	2.91
Overall Satisfaction	3.33	2.74	3.04	3.12	3.10	3.06	2.67	3.19
Did the system do what you expected it to do? (%)								
Yes	87.50	89.74	80.00	70.59	100.00	92.80	57.14	92.40
No	0.00	10.26	8.00	11.76	0.00	4.80	21.43	2.34
Haven't decided	12.50	0.00	12.00	17.65	0.00	2.40	21.43	5.26
Would you recommend system to another user? (%)								
Yes	75.00	52.63	64.00	82.35	33.33	72.58	42.86	90.64
No	4.17	31.58	8.00	5.88	44.44	23.39	21.43	2.92
Haven't decided	20.83	15.79	28.00	11.76	22.22	4.03	35.71	6.43

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

Users Rate Their Mainframes . . .

Survey Item \ Manufacturer and Model	IBM 4341	IBM 3031 & 3032	IBM 3033	IBM 308X Series	IPL 4400 Series	Magnuson M80 Series	NAS AS/3, AS/5, AS/6	NAS AS/7000 AS/9000
No. of User Responses	386	61	122	107	12	19	19	13
No. of Systems Represented	479	83	175	168	12	23	20	13
Avg. Life of System (Mos.)	27.7	48.6	33.9	19.0	22.6	33.1	65.0	31.9
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	13.32	27.87	14.29	3.77	0.00	0.00	15.79	7.69
Yes, Vendor Unknown	1.04	3.28	0.84	0.00	0.00	0.00	21.05	0.00
Yes, Different vendor	1.04	0.00	0.00	0.00	0.00	5.26	5.26	0.00
No	84.60	68.85	84.87	96.23	100.00	94.74	57.89	92.31
Significant Advantages (%)								
Users are happy with response time	63.21	55.74	60.66	67.29	66.67	63.16	52.63	53.85
System is easy to expand/reconfigure	57.51	36.07	45.90	57.94	83.33	89.47	26.32	69.23
System costs were less than expected	13.99	9.94	11.48	5.61	33.33	36.84	42.11	7.69
Programs/data carried over from other systems are compatible, as vendor promised	60.36	60.66	64.75	75.70	75.00	94.75	73.68	76.92
Terminals/peripherals carried over from other systems are compatible, as vendor promised	56.74	57.38	63.93	77.57	58.33	68.42	63.16	76.92
System is power/energy efficient	59.59	9.84	20.49	50.47	83.33	73.68	52.63	23.08
Productivity aids help us keep programming costs down	27.20	24.59	27.87	32.71	25.00	21.05	0.00	7.69
Data base language is efficient and effective	13.21	9.20	25.41	13.08	0.00	21.05	15.79	7.69
Delivery and/or installation of equipment was ahead of schedule	17.88	13.11	19.67	18.69	58.33	68.42	21.05	61.54
Delivery of required software was ahead of schedule	7.77	13.11	7.38	8.41	16.67	31.58	10.53	30.77
Significant Problems (%)								
Computer proposed by vendor was too small	4.40	3.28	0.82	0.93	0.00	0.00	0.00	7.69
Installation of equipment was late	3.11	3.28	5.74	0.93	0.00	5.26	5.26	0.00
Delivery of required software was late	5.96	3.28	4.10	0.00	0.00	0.00	10.53	0.00
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	10.88	8.20	10.66	3.74	8.33	0.00	10.53	0.00
Vendor did not provide all the promised software or support	10.88	6.56	4.92	2.80	8.33	15.79	5.26	15.38
Program/data compatibility not what vendor promised	1.81	0.00	1.64	1.87	0.00	0.00	0.00	0.00
Terminals/peripherals compatibility not what vendor promised	1.81	0.00	3.28	0.93	0.00	0.00	0.00	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	13.99	11.48	16.39	14.95	0.00	5.26	10.53	0.00
Equipment is excessively noisy	0.52	0.00	0.00	0.00	0.00	0.00	0.00	7.69
Power and/or cooling requirements are excessive	1.04	13.11	11.48	2.80	0.00	0.00	5.26	23.08
System Ratings (4.0-1.0)								
Ease of Operation	3.26	3.05	3.21	3.25	3.75	3.58	3.05	3.31
Reliability of Mainframe	3.82	3.59	3.59	3.61	3.73	3.68	3.37	3.62
Reliability of Peripherals	3.32	3.27	3.32	3.25	3.38	3.31	2.95	2.91
Maintenance Service:								
Responsiveness	3.34	3.25	3.43	3.38	3.55	3.42	3.47	3.62
Effectiveness	3.31	3.22	3.41	3.35	3.55	3.26	3.32	3.50
Technical Support:								
Trouble-shooting	2.86	2.89	3.04	3.16	3.40	3.00	3.11	2.92
Education	2.77	2.74	2.99	2.96	3.00	2.59	2.67	2.58
Documentation	2.67	2.59	2.81	2.88	3.00	2.67	2.67	2.58
Manufacturer's Software:								
Operating System	3.06	3.13	3.24	3.33	3.00	3.45	2.93	2.86
Compilers & Assemblers	3.19	3.18	3.31	3.37	3.00	3.40	3.33	2.71
Applications Programs	2.75	2.71	2.83	3.01	3.00	3.33	2.64	3.00
Ease of Programming	2.94	2.80	2.84	2.93	3.20	3.23	2.92	3.00
Ease of Conversion	2.99	2.84	2.93	3.21	3.50	3.57	3.08	3.33
Overall Satisfaction	3.18	3.10	3.21	3.28	3.11	3.39	3.11	3.31
Did the system do what you expected it to do? (%)								
Yes	94.03	95.08	94.21	93.46	100.00	94.74	100.00	100.00
No	2.08	3.28	1.65	0.93	0.00	5.26	0.00	0.00
Haven't decided	3.90	1.64	4.13	5.61	0.00	0.00	0.00	0.00
Would you recommend system to another user? (%)								
Yes	93.51	85.25	92.56	93.46	100.00	89.47	83.33	76.92
No	1.30	11.48	0.83	0.00	0.00	10.53	5.56	7.69
Haven't decided	5.19	3.28	6.61	6.54	0.00	0.00	11.11	15.38

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

Survey Item \ Manufacturer and Model	NCR 8400 & 8500	Sperry Univac 90/30 & 90/40	Sperry Univac 90/60 & 90/80	Sperry Univac System 80	Sperry Univac 1100/60	Sperry Univac 1100/80	Sperry Univac 1100 Series (Other Models)	Mainframes (Other Models)
No. of User Responses	97	45	8	24	28	14	6	34
No. of Systems Represented	107	49	12	28	34	20	12	45
Avg. Life of System (Mos.)	42.2	62.6	56.8	25.2	30.3	52.7	47.5	72.1
Plans for system replacement in 1983 (%)								
Yes, Same Manufacturer	6.19	18.18	12.50	8.33	3.57	7.14	50.00	11.76
Yes, Vendor Unknown	2.06	4.55	0.00	0.00	0.00	7.14	0.00	17.65
Yes, Different vendor	3.09	9.09	0.00	4.17	0.00	0.00	0.00	14.71
No	88.66	68.18	87.50	87.50	96.43	85.71	50.00	55.88
Significant Advantages (%)								
Users are happy with response time	57.73	44.44	62.50	62.50	60.71	64.29	16.67	32.35
System is easy to expand/reconfigure	73.20	48.89	62.50	62.50	64.29	57.14	50.00	38.24
System costs were less than expected	16.49	8.89	12.50	8.33	17.86	7.14	16.67	26.47
Programs/data carried over from other systems are compatible, as vendor promised	61.86	37.78	62.50	54.17	25.00	50.00	16.67	50.00
Terminals/peripherals carried over from other systems are compatible, as vendor promised	40.21	15.56	37.50	4.17	25.00	42.86	33.33	29.41
System is power/energy efficient	14.43	6.67	12.50	41.67	42.86	28.57	33.33	17.65
Productivity aids help us keep programming costs down	26.80	31.11	50.00	50.00	46.43	14.29	33.33	17.65
Data base language is efficient and effective	6.19	6.67	12.50	12.50	32.14	50.00	50.00	11.76
Delivery and/or installation of equipment was ahead of schedule	9.28	17.78	12.50	20.83	46.43	50.00	16.67	5.88
Delivery of required software was ahead of schedule	5.15	11.11	0.00	4.17	25.00	14.29	16.67	5.88
Significant Problems (%)								
Computer proposed by vendor was too small	8.25	31.11	12.50	41.67	21.43	14.29	16.67	17.65
Installation of equipment was late	10.31	11.11	0.00	33.33	7.14	7.14	0.00	14.71
Delivery of required software was late	15.46	17.78	25.00	20.83	10.71	0.00	0.00	8.82
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	13.40	24.44	12.50	33.33	21.43	0.00	0.00	8.82
Vendor did not provide all the promised software or support	24.74	20.00	37.50	20.83	17.86	7.14	0.00	8.82
Program/data compatibility not what vendor promised	5.15	6.67	0.00	12.50	3.57	0.00	0.00	0.00
Terminals/peripherals compatibility not what vendor promised	3.09	2.22	0.00	8.33	0.00	0.00	16.67	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	10.31	35.56	37.50	20.83	17.86	14.29	33.33	8.82
Equipment is excessively noisy	7.22	8.89	0.00	4.17	3.57	7.14	0.00	17.65
Power and/or cooling requirements are excessive	6.19	11.11	25.00	0.00	14.29	0.00	33.33	26.47
System Ratings (4.0-1.0)								
Ease of Operation	3.40	3.13	3.13	3.22	3.21	3.36	3.50	3.15
Reliability of Mainframe	3.47	3.38	3.63	3.57	3.57	3.57	3.17	3.15
Reliability of Peripherals	3.19	2.95	3.00	3.26	2.86	3.00	2.50	2.79
Maintenance Service:								
Responsiveness	3.12	3.11	3.63	3.25	3.32	3.62	3.33	3.21
Effectiveness	3.06	2.80	3.50	2.91	3.00	3.08	2.33	3.00
Technical Support:								
Trouble-shooting	2.46	2.28	2.75	2.75	2.68	2.85	2.40	2.58
Education	2.69	2.23	2.25	2.39	2.32	2.71	2.60	2.24
Documentation	2.38	2.35	2.00	2.30	2.18	2.29	2.50	2.17
Manufacturer's Software:								
Operating System	3.10	3.09	3.00	3.17	3.29	3.54	3.33	2.91
Compilers & Assemblers	3.03	3.18	3.00	3.29	3.11	3.23	2.83	2.91
Applications Programs	2.54	2.19	2.17	2.73	2.77	2.91	3.00	2.71
Ease of Programming	2.98	2.93	3.25	3.08	3.07	3.08	2.80	2.91
Ease of Conversion	3.18	2.85	2.75	2.78	2.63	3.00	2.17	2.55
Overall Satisfaction	3.06	2.93	3.25	3.00	3.07	3.00	2.83	2.85
Did the system do what you expected it to do? (%)								
Yes	87.63	80.00	75.00	70.83	78.57	84.62	100.00	91.18
No	5.15	17.78	25.00	12.50	7.14	0.00	0.00	2.94
Haven't decided	7.22	2.22	0.00	16.67	14.29	15.38	0.00	5.88
Would you recommend system to another user? (%)								
Yes	79.38	55.56	37.50	75.00	85.71	71.43	80.00	46.88
No	10.31	22.22	37.50	12.50	7.14	7.14	20.00	43.75
Haven't decided	10.31	22.22	25.00	12.50	7.14	21.43	0.00	9.38

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

COMPUTERWORLD

May 16, 1983

. . . And the Vendors of Those Mainframes

Survey Item \ Manufacturer and Model	Amdahl	Burroughs	Control Data	Digital Equipment	Honeywell	IBM
No. of User Responses	46	90	6	38	81	998
No. of Systems Represented	83	130	9	56	100	1286
Avg. Life of System (Mos.)	36.5	43.02	48.7	58.2	57.2	34.8
Plans for system replacement in 1983 (%)						
Yes, Same Manufacturer	15.22	11.24	0.00	5.26	7.50	17.29
Yes, Vendor Unknown	17.39	4.49	0.00	0.00	6.25	2.33
Yes, Different vendor	2.17	2.25	0.00	2.63	12.50	0.81
No	65.22	82.02	100.00	92.11	73.75	79.58
Significant Advantages (%)						
Users are happy with response time	71.74	43.33	33.33	60.53	54.32	56.81
System is easy to expand/reconfigure	43.48	73.33	50.00	71.05	56.79	49.60
System costs were less than expected	23.91	7.78	0.00	10.53	6.17	13.33
Programs/data carried over from other systems are compatible, as vendor promised	73.91	50.00	50.00	31.58	32.10	58.22
Terminals/periph. carried over from other systems are compatible, as vendor promised	69.57	44.44	16.67	34.21	13.58	52.71
System is power/energy efficient	41.30	23.33	16.67	15.79	16.05	41.58
Productivity aids help us keep programming costs down	26.09	32.22	0.00	44.74	24.69	26.15
Data base language is efficient and effective	23.91	36.89	0.00	31.58	28.40	13.03
Delivery and/or installation of equipment was ahead of schedule	36.96	12.22	0.00	15.79	8.64	17.94
Delivery of required software was ahead of schedule	17.39	10.00	0.00	5.26	4.94	9.22
Significant Problems (%)						
Computer proposed by vendor was too small	4.35	8.89	0.00	13.16	14.81	4.61
Installation of equipment was late	2.17	31.11	0.00	7.89	14.81	3.61
Delivery of required software was late	2.17	12.22	0.00	15.79	14.81	4.91
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	6.52	13.33	0.00	7.89	22.22	9.92
Vendor did not provide all the promised software or support	4.35	17.78	0.00	10.53	25.93	7.92
Program/data compatibil. not what vendor promised	0.00	4.44	0.00	2.63	4.94	2.00
Terminals/peripherals compatibility not what vendor promised	2.17	1.11	0.00	0.00	3.70	1.80
Vendor enhancements/changes to hardware/software hard to keep up with	4.35	20.00	16.67	7.89	13.58	14.93
Equipment is excessively noisy	4.35	6.67	16.67	18.42	11.11	0.90
Power and/or cooling requirements are excessive	8.70	13.33	50.00	15.79	11.11	8.42
System Ratings (4.0-1.0)						
Ease of Operation	3.37	3.60	2.83	3.73	3.14	3.19
Reliability of Mainframe	3.57	3.29	3.33	3.42	3.28	3.67
Reliability of Peripherals	3.17	2.85	3.00	2.94	2.95	3.28
Maintenance Service:						
Responsiveness	3.41	2.95	3.33	3.11	3.17	3.34
Effectiveness	3.41	2.70	3.00	3.03	3.04	3.30
Technical Support:						
Trouble-shooting	3.40	2.35	2.83	2.60	2.64	2.90
Education	2.95	2.24	2.67	2.50	2.44	2.77
Documentation	2.92	2.00	3.00	2.69	2.34	2.70
Manufacturer's Software:						
Operating System	3.11	3.55	2.83	3.63	3.24	3.11
Compilers & Assemblers	3.13	3.17	3.17	3.13	3.17	3.23
Applications Programs	2.87	2.62	2.25	2.76	2.33	2.82
Ease of Programming	3.00	3.22	2.83	3.53	2.99	2.92
Ease of Conversion	3.09	3.07	2.83	3.03	2.61	2.97
Overall Satisfaction	3.31	3.03	2.83	3.32	2.91	3.16
Did the system do what you expected it to do? (%)						
Yes	97.98	83.33	83.33	89.47	82.72	93.16
No	0.00	8.89	0.00	2.63	9.88	2.62
Haven't decided	2.22	7.78	16.67	7.89	7.41	4.23
Would you recommend system to another user? (%)						
Yes	95.56	75.56	66.67	77.78	62.50	88.51
No	2.22	7.78	33.33	5.56	18.75	5.44
Haven't decided	2.22	16.67	0.00	16.67	18.75	6.05

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

Survey Item \ Manufacturer and Model	IPL	Magnuson	NAS	NCR	Sperry Univac	Other Mainframes
No. of User Responses	12	19	32	97	125	34
No. of Systems Represented	12	23	33	107	152	46
Avg. Life of System (Mos.)	22.6	33.1	50.2	42.2	45.4	72.1
Plans for system replacement in 1983 (%)						
Yes, Same Manufacturer	0.00	0.00	12.50	6.19	12.90	11.76
Yes, Vendor Unknown	0.00	0.00	12.50	2.06	2.42	17.65
Yes, Different vendor	0.00	5.26	3.13	3.09	4.03	14.71
No	100.00	94.74	71.88	88.66	80.65	55.88
Significant Advantages (%)						
Users are happy with response time	66.67	63.16	53.13	57.73	53.60	32.35
System is easy to expand/reconfigure	83.33	89.47	43.75	73.20	56.80	38.24
System costs were less than expected	33.33	36.84	28.13	16.49	11.20	26.47
Programs/data carried over from other systems are compatible, as vendor promised	75.00	94.75	75.00	61.86	40.00	50.00
Terminals/periph. carried over from other systems are compatible, as vendor promised	58.33	68.42	68.75	40.21	20.80	29.41
System is power/energy efficient	83.33	73.68	40.63	14.43	25.60	17.65
Productivity aids help us keep programming costs down	25.00	21.05	3.13	26.80	37.60	17.65
Data base language is efficient and effective	0.00	21.05	12.50	6.19	20.80	11.76
Delivery and/or installation of equipment was ahead of schedule	58.33	68.42	37.50	9.28	28.00	5.88
Delivery of required software was ahead of schedule	16.67	31.58	18.75	5.15	12.80	5.88
Significant Problems (%)						
Computer proposed by vendor was too small	0.00	0.00	3.13	8.25	27.20	17.65
Installation of equipment was late	0.00	5.26	3.13	10.31	12.80	14.71
Delivery of required software was late	0.00	0.00	6.25	15.46	14.40	8.82
System costs (for hardware, vendor-supplied software, support) exceeded the expected total	8.33	0.00	6.25	13.40	20.80	8.82
Vendor did not provide all the promised software or support	8.33	15.79	9.38	24.74	18.40	8.82
Program/data compatibil. not what vendor promised	0.00	0.00	0.00	5.15	5.60	0.00
Terminals/peripherals compatibility not what vendor promised	0.00	0.00	0.00	3.09	3.20	0.00
Vendor enhancements/changes to hardware/software hard to keep up with	0.00	5.26	6.25	10.31	26.40	8.82
Equipment is excessively noisy	0.00	0.00	3.13	7.22	5.60	17.65
Power and/or cooling requirements are excessive	0.00	0.00	12.50	6.19	10.40	26.47
System Ratings (4.0-1.0)						
Ease of Operation	3.75	3.58	3.16	3.40	3.21	3.15
Reliability of Mainframe	3.73	3.68	3.47	3.47	3.48	3.15
Reliability of Peripherals	3.38	3.31	2.93	3.19	2.96	2.79
Maintenance Service:						
Responsiveness	3.55	3.42	3.53	3.12	3.28	3.21
Effectiveness	3.55	3.26	3.39	3.05	2.92	3.00
Technical Support:						
Trouble-shooting	3.40	3.00	3.03	2.46	2.55	2.58
Education	3.00	2.59	2.62	2.69	2.36	2.24
Documentation	3.00	2.67	2.63	2.38	2.28	2.17
Manufacturer's Software:						
Operating System	3.00	3.45	2.91	3.10	3.20	2.91
Compilers & Assemblers	3.00	3.40	3.14	3.03	3.16	2.91
Applications Programs	3.00	3.33	2.75	2.54	2.53	2.71
Ease of Programming	3.20	3.23	2.95	2.98	3.02	2.91
Ease of Conversion	3.50	3.57	3.19	3.18	2.76	2.55
Overall Satisfaction	3.11	3.39	3.19	3.06	3.00	2.86
Did the system do what you expected it to do? (%)						
Yes	100.00	94.74	100.00	87.63	79.03	91.18
No	0.00	5.26	0.00	5.15	12.10	2.94
Haven't decided	0.00	0.00	0.00	7.22	8.87	5.88
Would you recommend system to another user? (%)						
Yes	100.00	89.47	80.65	78.38	67.74	46.88
No	0.00	10.53	6.45	10.31	16.13	43.75
Haven't decided	0.00	0.00	12.90	10.31	16.13	9.38

© 1983 Datapro Research Corporation, Delran, N.J. 08075 U.S.A.

EDITORIAL

Keep a Tighter Rein

DP managers are learning that it is better to be safe than sorry when it comes to deterring computer crime, as three stories in last week's issue of *Computerworld* demonstrated.

In Illinois recently, officials at Southern Illinois University unraveled a trail of computer fraud stretching back five years, 2½ years after the alleged ringleader had resigned his post as director of computing affairs at the university. According to court papers, the school estimates that at least five other DP employees were involved in the scam.

Halfway across the country, in Olympia, Wash., a programmer/analyst managed to steal $17,000 over 10 months via a government systems installation. The theft was discovered accidentally during a routine audit. Ironically, the self-confessed thief's job responsibilities included designing safeguards to prevent unauthorized access to the state's system.

In New York, a speaker at a seminar on computer crime exhorted his listeners to take note of unusual changes in an employee's life-style; it could be a sign of computer abuse, he warned.

For the DP manager, there are lessons to be learned from this sampling of computer-related crime that is by no means atypical. In the cases above, the culprits held upper level positions with responsibilities for systems security, financial issues or both and were able to use their positions to commit crimes over substantial periods of time without detection.

Also, in both instances, the thefts were discovered accidentally during routine audits.

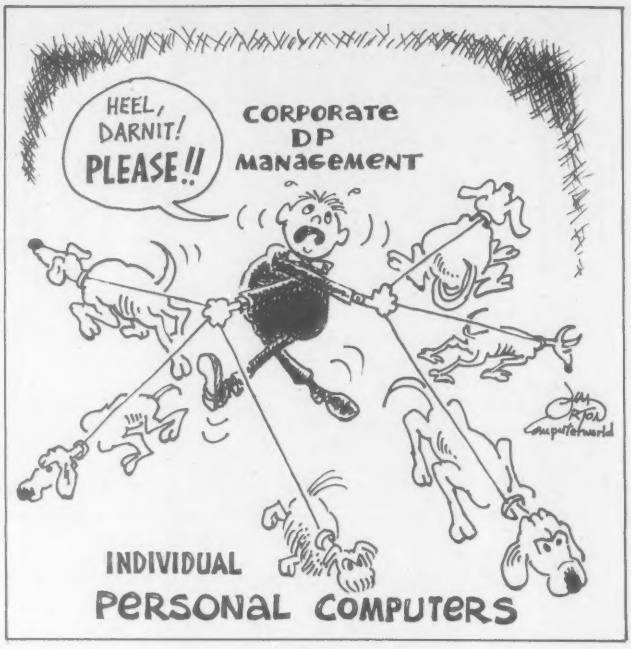
There are several steps that can be taken to combat the ease with which most computer crime seems to take place. DP managers need to keep a tighter rein in two areas — personnel and systems security. As suggested in the New York seminar, managers should take the time to check their security controls. Too often, DP and company officials assume such controls are in place when, in fact, they either are not or are easily circumvented. Also, the number of people with access to those codes should be limited and note should be taken of those with access.

Personnel is another area that merits close watch. By virtue of their scope of responsibilities, senior-level personnel warrant close scrutiny. Also, there is no reason why departmental audits should not be conducted immediately after a change of the guard.

And although some states and university regulations do not require it, substantial contracts for computer equipment should be competitively bid.

Obviously, despite all efforts, computer crime can happen. Secretly firing wrongdoers with a slap on the wrist hardly sets a good example. Since efforts to bring computer criminals to justice have in some cases been stymied by antiquated laws, DP managers have a responsibility to help lobby for stronger laws. One such bill is under consideration in Massachusetts.

Prompted by a 1981 Supreme Court ruling stating that a person who steals a magnetic tape could be prosecuted only for the value of the tape itself, the Massachusetts bill would classify electronic impulses as property, making it much easier to prosecute offenders for the value of the information that is recorded electronically. It is hoped that in turn, companies will take a more aggressive tact with suspected computer criminals.



LETTERS

Leave Keyboard Unlocked

I agree with Dick Smith's In Depth article "Faster Is Better" [CW, April 18] regarding the value of subsecond response time.

In particular, the comments regarding users who may wish to enter two or three transactions without interruption struck a rather sore nerve with me.

IBM has always emphasized a half-duplex communications protocol and a transaction-response terminal mode of operation in which the keyboard remains locked against further input until a transaction is completed.

There is nothing in this world more frustrating than a locked keyboard that breaks a train of thought. Smith's proposed solution is traditional, faster and bigger hardware. Why not simply leave the keyboard unlocked at all times and queue any user input that cannot be serviced immediately.

Minicomputers and microcomputers have operated with unlocked keyboards for years, utilizing full-duplex (really echo-plex) communications protocols.

IBM's VM/CMS tries to keep 3270 keyboards unlocked whenever possible, and VM is usually considered to be faster than TSO. Perhaps it is VM's unlocked keyboard as opposed to TSO's locked keyboard that is largely responsible for the perception that VM/CMS is faster than TSO.

R.G. Bryan
Systems Support Analyst
Newport News Shipbuilding
Newport News, Va.

Where's the Shortage?

As an entry-level programmer, I must voice my extreme displeasure with the continued harping over an alleged programmer shortage and terrible applications backlogs, as illustrated in the article "Micros Seen Holding Key to DPer Lack" [CW, April 25].

Of course it is the right of an employer to seek whatever type of employee he wants. But in no other sector of the work force besides data processing have I observed a profession so reluctant to add new talent to its ranks.

Is it planned that data processing will totally collapse when the last experienced programmer retires?

The want ads for the past year that I have seen have read: "Must have two years' experience." If this practice continues, in 1993 they may as well read "Must have 12 years' experience."

I am familiar with all of the arguments on the subject, but the game of stealing each other's people is absurd.

Do managers plan on paying experienced programmers $100,000 salaries in 1993? I, for one, would start at minimum wage and let my boss judge my worth from there.

There is a legion of us out here from which to choose, so please don't bore us with your crying about shortages. If you cannot find an experienced programmer, make one.

It's hard to believe that an occupation suffering from a so-called severe shortage of talent would not hire entry-level people.

Darell L. Case
Tempe, Ariz.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

LECHT ON SCIENCE /Charles P. Lecht

DP Lawyers: Hessians of U.S. Tech Revolution

This is the first of a two-part series on DP lawyers.

The current, apparently endless, spectacle of a computer/communications industry being rent by litigious frenzy is as depressing as it is unappetizing to all who witness or are otherwise caught up in it. The unmistakable smell of chicanery wafting up from it cries out for a remedy. At the very least, we should be suspicious of lawyers who seem comfortable plying their trade in the upper reaches of high technology when they are equipped neither by training nor experience to deal with the substantive issues they must find there.

The extent to which exactly such pushcart purveyors of law (as opposed to those appropriately outfitted with information and principle) clog and clamor in the streets of our scientific neighborhood genuinely alarms me: We need to take action before it becomes a slum.

I think that lawyers who represent themselves as capable of practicing in science should be subject to qualifying tests to establish that they meet certain standards for doing so. That is what our legal system and its main advocate, the American Bar Association (ABA), does to scientists who wish to be lawyers.

That lawyers hold their discipline to be out-of-bounds to scientists, raising the specter even of jail for those of us who encroach upon their domain without what are deemed to be proper credentials, should serve as motivation enough for us to prevent lawyers who would fraudulently practice science from corrupting our domain with their presumption.

But rest assured, the faintest hint that a nonlawyer may be venturing an opinion on the law as it pertains to science is guaranteed to elicit a passionate rebuke from some lawyer waving his ABA surgical bludgeon and crying, "What does he know about law?" Arrange a visit for the selfsame lawyer to an electronic laboratory, however, and he may well prove incapable of flipping the cloakroom light switch without technical assistance.

It is a tasteless joke to suggest that lawyers are informed in the exercise of their practice by anything resembling the dedication to the well-being of others expressed for physicians by the Hippocratic Oath. On the contrary, corruption is probably more efficiently ferreted out by people whose firsthand knowledge of it equips them to recognize its hiding places. From individual practioners to Charles Addams husband-and-wife teams to firms whose prestige resounds in a suspect firmament, fakery in handling data processing litigation is, unhappily, the norm.

At Sixes and Sevens

When the purchaser of a computer and/or communications system starts to run into usage difficulties, it is almost inevitable that both he and the system's manufacturer will find themselves at sixes and sevens (0s and 1s?). And if these difficulties persist, their relationship is bound to become even more strained, heating up with the passage of time.

Finally, at a critical moment, the dew point of data processing frustration is reached and in this saturated atmosphere, a noxious fog of lawyers forms, distributing itself evenly over the landscape, never more to disperse until the unfortunate human beings-turned-litigants are thoroughly leached of their money, their patience or, worse, their lives. For once on the scene, these succubi are quick to demonstrate what an unusually hardy strain they are, rather like tropical protozoa whose growth can only succeed in the rich agar-agar of the lawsuit.

That they can fulfill little more than a kind of Robert's Rules of Order referee function is surely unworthy of us in the industry, who are almost invariably as bright or brighter. To me, this conjures up an image of the scientist/industrialist as belonging to a race of highly evolved superbrains to be herded, corralled and fattened for the kill by lesser, but wilier and more aggressive, creatures.

Question of Degree

Don't get me wrong: I am not claiming either that all scientists are superbrains or that all lawyers are baboons. Nor do I think that unscrupulous behavior is the monopoly of any one professional group, since there is ample, if circumstantial, evidence to suggest it is pretty equally distributed among all groups. Thus, as always, it is a question of degree that becomes important in assessing the influence of otherwise routine incompetence and arrogance at any given moment in business. Behavior of this sort tends to skitter, with all the sensitivity (but none of the beauty) of quicksilver. No class or group of people can prevent it from forming a puddle that occasionally seems deeper in one spot than in another.

My involvement with DP-related litigation over the course of almost 30 years in the computer industry has found me cast in the role of plaintiff, defendant and expert witness. And while behind-the-scenes settlement negotiations in the last category have accounted for the overwhelming part of these affairs, some have also reached the courts.

Now it could be that the ineffable pleasure of working with nincompoops whose technological grasp of their cases has ranged from inaccurate to nil has been mine alone. Maybe I am the only soul to have noticed that legal eagles like these exist and cost their clients and companies untold misery (and money). But I don't think so.

Other (and recent) legal horror stories that reach my ears confirm the validity of my perception and experience. That a recently advertised call for support in bringing suit against a certain computer manufacturer elicited 400 replies speaks more directly to the ambulance-chasing mentality of the respondents' legal staffs than to anything else. Could the manufacturer in question have been so powerful a hypnotist that 400 sophisticated businessmen (at least) bought his pitch before someone finally blew the whistle? Baloney! Talk about lawyers gone wild in

(Continued on Page 86)

HUMAN CONNECTION /Jack Stone‡

We Want Value, Not Gimmicks, in Systems

Hear ye, hear ye! Let the trumpeters blare and let the drummers roll, for the executive scheduler has arrived!

In case you aren't already familiar with this software, let me advise you that various forms of it under different names are being touted by several vendors as the solution to the supposedly critical need for an automated calendar to aid peripatetic executives during their peregrinations.

I had my first encounter with one version of such a scheduler several weeks ago. It was on a minicomputer system I was using as part of a hands-on literacy class. After seeing it in operation, I have to say that I would not want to be the person to prepare a cost/benefit justification for its use, because it would be tough to do.

On the other hand, the next time you're feeling blue, find a terminal that supports the application and fool around with it for awhile. It will lift your spirits; it is the penultimate Donkey Kong of the business systems world.

Here's how it operates. Assume you are an executive who is really going to do something tomorrow, and I mean something really important. You are going to have to sit right down and figure out if you are going to engage in a task, set up a meeting or just do something.

If you decide to engage in a task, the machine prompts for its name, time slot and optional additional detail and stores the data. If you go the whole hog and choose to set up a meeting, the machine — through the miracle of modern-day computer automation — will scan the calendars of each person you want to invite to the affair, plus those of desired meeting rooms, and figure out common times of availability.

Some Fun

To have some fun, merely touch a few keys, and events for any day pop up on the display. Or if you need a broader perspective, a different sequence will show your weekly calendar or, alternatively, the monthly summary.

Let's simulate the situation in which you see the monthly spread and are interested in what is happening on a specific day.

You push a couple of buttons and whammo — the weekly spread is selected. A few more taps and pow — the daily detail shows up.

After demonstrating this electronic gem to the class I was giving, one of the attendees must have sensed something awry because he asked the question "Is this software really practical for executives?"

Depends on Needs

My response to this is: I have to say, in fairness, that some firms will find it practical and others will not; it depends on their particular needs and what resources they are willing to commit to support such a system.

For example, it seems to me that each executive — or at least each executive secretary — who uses the system must have immediate access to a terminal for purposes of updating and retrieval.

Of course, a $5,000, 100-lb workstation is rather committed to one location, but one vendor with a scheduling capability recognized the need for portability and built the program into a programmable read-only memory and supported it with a $1,000 battery-operated, 4-lb-class intelligent terminal.

Then all participants must guarantee that they will update their schedules at least daily, maybe hourly, to make certain that the data is reasonably current.

The practical problem is that updating calendars is not necessarily the highest priority task of most executives, and I would guess that confidence in the quality of data would tend to falter if the updating fell behind. Also, what about executives who perpetually travel? Might not a $9.95 wallet-size calendar handle most of the necessary work?

My larger concern about the scheduling package is not so much with the software — which actually does a decent job — but with its implications.

If a DP manager attempts to justify an executive workstation on the basis of systems like scheduler and not on systems of substantially greater consequence to executives, DPers may be inadvertently leaving an impression of computer gimcrackery, which would be totally counterproductive to a plan for moving executives onto terminals.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

THE DATA CENTER / John P. Murray‡

How Does Your MIS Group Handle Problems?

There are several criteria that can be used to determine the effectiveness and the quality of a management information systems (MIS) department. Some of the more obvious things to check for come rather quickly to mind: service level, sound client relationships, an aggressive use of state-of-the-art techniques and adherence to budget, to name a few.

There is another measure — a more subtle but very effective measure — of a high-quality MIS function. This measurement has to do with the ability of the MIS department to overcome adversity in whatever form and to continue to produce the desired results.

This is not a commendation of the ability of an MIS installation to survive on a continuing basis in a crisis environment. That ability is not a reflection of a high-quality, well-run MIS department; it may be a tribute to the hard work of many dedicated people.

But it is also a reflection of poor MIS management. The issue here is with the ability of the MIS department to react to and to overcome those occasional or unusual problem situations that are brought about either through MIS errors or from sources outside the MIS department.

It is impossible to eliminate all difficult situations in an MIS function. We are involved in too many high-risk ventures and are simply much too vulnerable to forces beyond our immediate control to attempt to build error-free environments. The goal, then, should not be to eliminate all difficulties, but to manage effectively difficult situations when they arise.

There is no need to go through a litany of the causes of the problems we face; we are all familiar with them. What is of concern here, relative to being able to measure the effectiveness of the MIS function, is how the problems, once identified, are handled. Do new problems simply increase the crisis level in the MIS department, or are they handled in a professional manner?

In poorly managed installations, the usual first step once a problem has surfaced is to engage in a finger-pointing session with everyone involved rather than to move to the problem at hand and solve that problem. In these situations, a great deal of time, effort and energy is needlessly expended upon what at that particular time is the wrong issue. Under these circumstances, the focus is on the cause of the problem; it should be on correcting the difficulty.

In a typical poorly managed MIS installation, the usual next step is to go through a series of false starts in the process of attacking the problem. Often, several people will go off in different directions, attempting to attack the problem from several isolated positions, rather than to work together to define the problem and then continue to work as a team to implement an effective solution to that problem.

With the approach that is usually taken in a poorly managed MIS installation, more time is wasted, more effort needlessly expended and, as a result, unnecessary confusion is generated. What may have originally been a rather straightforward although urgent problem now escalates to a crisis situation.

Well-Managed Installation

In a well-managed MIS installation, a different approach is taken to solve the problem. The question of who is at fault does not come up. Rather, the focus is on the particular problem, whatever it may be, and on its solution. The primary step is to identify the real cause of the difficulty, not to solve the symptom. This process is carried on in a spirit of teamwork and cooperation by everyone involved.

A plan of action is then developed that identifies and prioritizes the problems and then assigns appropriate responsibility for the correction of each item on the plan of action. Some member of the MIS department is given responsibility for the overall coordination and control of the process, and swift progress is made to attack the problems. This may mean that people have to work very hard and put in long hours.

A strong MIS function handles unusual situations with dispatch and professionalism. The members understand that difficult situations that call for extra effort will arise, and when they do, everyone who can help swings into action to solve the problem. When this occurs, a high degree of MIS effectiveness is achieved. The members of such an MIS department should feel good about the job they are doing.

Murray is director of MIS for Ray-O-Vac Corp. in Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

In just 7 hours you can put the power of networking in data communications to work for your company.

Sign up for this new seminar now.

How does your network grow? You can save time and costly mistakes simply by learning the basics in data communications now. This seminar can help. It shows how modems and multiplexers work. What carriers offer. And it even covers alternatives for efficiently extending computing resources to remote locations. And gives you a list of "must questions" for suppliers that can save you money.

All that plus priceless advice and techniques on how to analyze your own network needs. Bonus: Infotron's Network Traffic Analysis Worksheet. Includes formulas, worksheet, template...everything to make figuring out your own network requirements easier. Don't miss out. This seminar will pay for itself in time and money again and again. Sign up today.

Location:	*Date:*
Philadelphia	May 10
Pittsburgh	May 12
Chicago	May 24
St. Paul, MN	May 26
Washington, D.C.	June 6
New York	June 8
Boston	June 10
Los Angeles	June 14
San Francisco	June 16

Pick up the phone and put the power of networking in data communications to work for you. Call Sandy Harper at Infotron, (800) 257-8352 or (609) 424-9400 in New Jersey. Ask about our seminars and our free brochures.

If you already have a network ask about our *Executive Seminar on Data Communications and Network Systems* which covers all the latest Infotron networking products.

Infotron Systems

Infotron Systems Corporation • 9 North Olney Avenue • Cherry Hill, New Jersey 08003

CLONE YOUR RADIO SHACK TRS-80® MODEL 16 INTO A 3-WORKSTATION SYSTEM AND SAVE $5,105

Introducing the TRS-XENIX™ Multi-User Operating System By Microsoft®

Give three people in your office the power of our most powerful microcomputer . . . without buying three separate systems. All you need is one TRS-80 Model 16, 256K memory, a hard disk system and two of our $699 DT-1 terminals.

A Powerful Office System

Think of it. Three people. All performing different tasks. All at the same time, on the same computer. And all for $9892.*

That price is for a system with *three* workstations, the latest 16/32-bit technology and 12 megabytes of hard disk storage. And it's $5105 less than three TRS-80 Model 16 computers . . . *without* the hard disk!

The Secret: TRS-XENIX

It's the state-of-the-art multi-user operating system that comes with every Model 16, and is derived from Western Electric's UNIX™, a field-tested operating system.

The Value of Shared Resources

All of your data can be stored on the hard disk system. Files can then be shared by all users in the system, or restricted to certain users only. And everyone in the system can share the peripherals attached to the Model 16—from printers to plotters to modems!

Specially Designed Software

Think of the possibilities. Your sales department could check inventory levels while someone in accounting updates your general ledger—at the same time someone else is working on payroll!

Multi-user programs for accounting and inventory are available now, and we have more programs on the way.

Exclusively from Radio Shack, The Computer Experts

The TRS-XENIX multi-user system is available now. For more information, stop by a Radio Shack Computer Center, the expanded computer department in Radio Shack stores or a participating dealer near you.

*** SPECIAL BONUS OFFER!**
If you purchase a 128K Model 16 now, we'll include an extra 128K memory kit (regularly $499, Cat. No. 26-6012) at no charge!

Radio Shack®

The biggest name in little computers®
A DIVISION OF TANDY CORPORATION

Send me a free copy of your new TRS-XENIX brochure.
Mail To: Radio Shack, Dept. 83-A-207
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE ____ ZIP _____
PHONE _____

Retail prices may vary at individual stores and dealers. Cables and required installation not included. XENIX is a trademark of Microsoft Corp. UNIX is a trademark of Bell Laboratories.

READER COMMENTARY

Case of the Daytime Moonlighters: A Reason

With computer crime laws in effect in 18 states now, the data processing professional might well wonder how these new laws will affect the conditions under which he will work.

Consider the case of Frank Lewis and Cathy Benedict, two entrepreneurial programmers whose moonlighting in the daylight got them in trouble with the law.

They had formed a company called Arid Computer Systems, which provided computer services to Certified Food, a Los Angeles food wholesaler. In 1981, Lewis went to work for CHB Foods, Inc., a competitor of Certified Food's, to update CHB's wholesale pricing programs. Once employed, Lewis did considerable work for Certified Food. His contract began at $1,000 per month regardless of the volume of work performed and could go to $2,600 per month in additional labor charges. Later, he brought Benedict to work for CHB as operations manager.

Key Issue

As is often the case in criminal law, a key issue in the case against Lewis and Benedict is intent: Did they intend to use the CHB computer for fraud or misrepresentation? If not, prosecution under the California computer crime law will be difficult. The question of intent invites a rare look into what happens at a data processing center, as the following questions demonstrate:

- How thoroughly are employees checked before they are hired?

Depending on which of the court documents you believe, Lewis was well (or poorly) checked out before he was hired. Lewis' papers point to court testimony that a supervisor had discussed his prior work for Certified Food with a representative of that company. Los Angeles prosecutor Clifton Garrott was quoted in *Computerworld* as claiming that CHB "apparently knew nothing of Lewis' and Benedict's outside business dealings when the pair was first hired" [CW, July 26].

However, there is no evidence that anyone ever flat-out asked Lewis whether he would be doing any programming on company machines that might interfere with his duties. Nor is there any evidence of Lewis volunteering information about possible conflicts of interest.

- How well are policies on employee time use communicated and enforced?

Defendants Lewis and Benedict claim that their open use of the CHB computers proves that they had no intent to commit computer crime.

Lewis and Benedict's papers urged that they were open about the work they were doing for Certified Food. They point to testimony that a separate file designation was used on all files processed for Certified Food and that this designation was known to members of the staff at CHB.

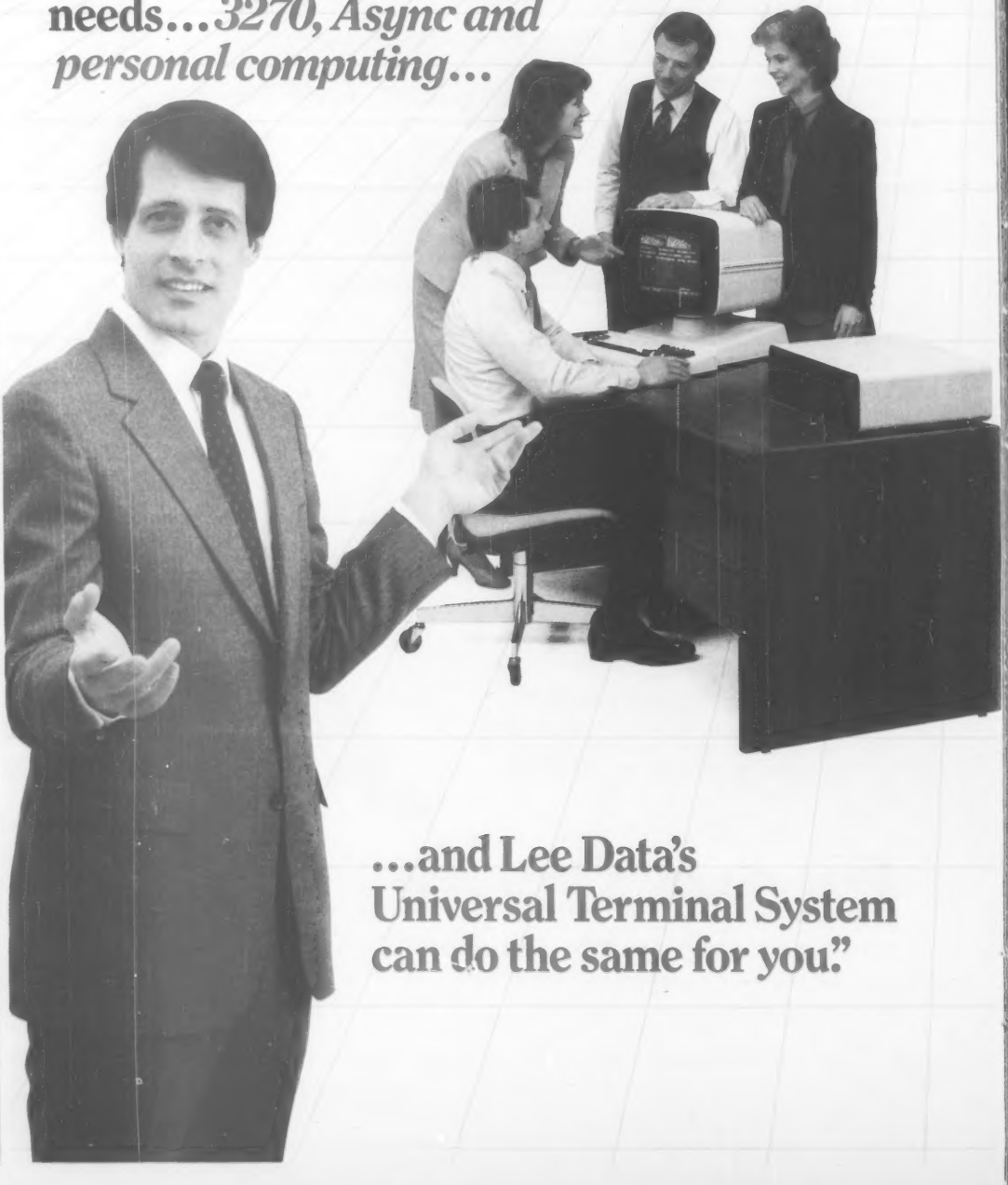
The prosecution challenges this characterization, focusing on testimony that employees were not allowed access to the computer center when Certified Food programs were being run.

There is also testimony that employees of CHB had to do more work, some of it compensated with overtime pay, just to take care of the excess that resulted from Lewis' and Benedict's efforts.

- How do you value your time?

Can a value be put on computer time? The answer to that question may determine whether Lewis and Benedict are guilty of theft. Lewis and Benedict are charged with theft, attempted theft and computer crime. In a pretrial motion, they urged dismissal of their case based on inadequacy of the

"Yes, one terminal system satisfies all of their information processing needs...*3270, Async and personal computing...*



...and Lee Data's Universal Terminal System can do the same for you."

Jay BloomBecker‡

for Making Preemployment Agreements

showing of evidence at the preliminary hearing in their case held last August.

California law requires a showing that stolen property is valued at more than $400 for felony theft charges to stick. In this case, the programmers claim that the prosecutors have not proven that the time they used had that much value.

Both sides seem to accept as fact that Lewis and Benedict used the CHB computer for 158 hours on Certified Food jobs. Putting a value on the computer time is a lot harder. CHB leased its computers on a monthly, flat-fee basis, paying no more if the computer was used 24 hours a day than if not at all. There was slack time anyway, the defendants argue.

Questionable Reply

In a questionable reply, the prosecution argues that the payment of $1,000 a month to Arid Computer is evidence of the value of the computer services. But that would be true only if the $1,000 figure contained no compensation for Lewis' and Benedict's own contributions to the effort. The prosecution avoids the hard question: What if the defendants argue that they are getting paid all of the $1,000 a month for their expertise, and the amount paid for use of the computer is minimal? How does the prosecution prove them wrong?

If you were to receive a call from Los Angeles' top computer crime prosecutor asking how you would establish the value of your computer time in a situation like this, what would you reply?

An alternative prosecution theory, of interest to all employees I am sure, is that premeditated daytime moonlighting is theft of salary. Los Angeles prosecutor Garrott contended in court papers that there is an implicit promise to work only in the employer's interest when one assumes a job.

Not too surprisingly, the defendants disagree; they contend that they were told just to get the work done and they did.

Who's Right?

Who is right? Have Lewis and Benedict broken a promise? In retrospect, the lesson is clear: The promise should have been explicit. A written promise carries much more weight than an implicit one.

The more we value our computer operations, the more we have got to value personnel who contribute to those operations. The programmer, the data manager, the analyst and the operator are all assets necessary to the data processing operation. Protect their work with whatever communication style your management policy dictates, but do not ignore their worth.

Remember that problems like the one CHB wound up with in this case could not occur quite so easily if adequate preemployment agreements defined each side's understanding of rights and responsibilities.

BloomBecker is an attorney specializing in computer crime law, director of the National Center for Computer Crime Data in Los Angeles and editor of the monthly Computer Crime Digest.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

As an example, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes —including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

LETTERS

Not a One-Time Fix

In the editorial "Promises, Promises" [CW, April 18], *Computerworld* looks at the information center as a technique to reduce the application backlog and as one of the tools to "improve the efficiency of the MIS [management information systems] organization." In view of the significance of the application backlog to the typical data processing manager, your other comments in the editorial are understandable.

Consider that for many installations, the information center has enabled faster implementation of applications, unearthed invisible backlog, increased demand for overall computing resources and placed new demands on the traditional MIS people in support of information center activities.

It is a misdirected comment, however, to say that the information center has not improved the efficiency of MIS because the total resource demands are higher. If we look at the situation from a different perspective, we see that end users are handling many technically trivial, ad hoc query and report requests themselves; highly skilled applications programmers are spending more time using those skills on complex applications built; and some end users are taking on the major design phase of new applications, providing some fairly extensive prototypes, as *Computerworld* points out.

Thus, demand may be greater and the backlog may be longer, but the efficiency is quite probably higher than it's ever been.

The real thrust of the information center is corporate productivity, not MIS efficiency. As many articles in *Computerworld* of recent months have pointed out, companies and government agencies are finding the information center a vehicle to improve individual productivity, score significant cost savings and improve managerial decision making.

It is only natural that an additional effect is to highlight and increase further the appetite for still greater application of the computer to business problems.

These are the problems of success. Business professionals have seen a glimpse of what technology can do for them and they want more.

The promise of the information center truly "has not yet been realized," but for reasons different from what the editorial cites. The information center should not be a simple one-time fix for getting rid of annoying end-user requests or a way of turning business professionals into an auxiliary programming corps. Rather, it should be the productivity driver of the corporation, orchestrating and integrating the effective use of all aspects of data processing to the goals of the organization.

There are many disparate activities moving rapidly within businesses today — office automation, personal computers, mainframe programming and interactive computing, to name a few. The information center should be, and in some companies already is, the place for MIS to provide the rational guidance and technical leadership the corporation will be needing.

Raymond E. Youstra
IBM
Gaithersburg, Md.

EASY READER

It's 3270-compatible and a lot more productive than monochrome.

It isn't hard to see why our easy-reading color display helps operators achieve more throughput and fewer errors than monochrome.

Instead of a whole screenful of one-color text, your operators see different fields displayed in different colors.

And, with our exclusive feature called Dynamic Color Assignment, you can "assign" the exact color you want each field to have. Either at the work station or at the cluster level.

Of course, with input information much easier to enter, customers using our color display find that their operators are much more productive.

On top of that, operators say that they get less eyestrain and neckstrain, and have fewer headaches than with monochrome.

Their managers report that our color display relieves budget pains, too. That the extra initial cost of our color display over our monochrome display is paid for in just six months by extra productivity.

Plus, when our color display replaces IBM monochrome, it looks even more cost-effective. You see, ITT Courier color is priced about the same as IBM monochrome.

So, looking at the big picture, an ITT Courier color display is not only easy to read, it's easy to buy. Or to lease.

For all the details, contact your nearest ITT Courier sales office. Or call toll-free:

1-800-528-1400 Ext. 7711.

Sales Support Dept.
ITT Courier Headquarters
Marketing
1515 W. 14th Street
Tempe, Arizona 85281

For even easier reading, our Dynamic Color Assignment feature lets you change color fields at the work station or cluster level.

Our easy-reading color display is a member of the ITT Courier family of IBM-compatible products.

ITT Courier®

DP Lawyers And High Tech

(Continued from Page 81)

providing advice on when or where not to sue! Do you honestly think that there exist 400 lawyers in the whole world with qualifications to prosecute an essentially technical case?

I do not dispute the worthiness of establishing as a goal that any given lawyer should be capable of properly applying the law wherever it was called for to resolve disputes. But even the various bar associations have singled out our field as requiring some form of special attention, in view of the lacunae that punctuate the technical knowledgeability of their membership.

While the law books may offer case histories that reach back even to the dawn of time (which, of course, they don't), precedent quite naturally fails when it is called upon to deal with situations that are, in effect, without precedent, such as the synthesis of heretofore discreet domains of electronic technology that characterizes the products of our industry today. And it is precisely when little (if any) precedent is available that most lawyers falter in carrying out their charges, right or wrong as these may be. When location of an event has little bearing on geography, jursidictional domains are fluid and culpability arises from unscheduled man/machine interaction, litigation does little more than wear down the combatants, while providing, surely not through sheer coincidence, an endless (and endlessly profitable) stream of work for lawyers.

Unable to lead to the resolution of anything of technical consequence, their special requirements unmet by Tweedledee-vs.-Tweedledum applications of incorrectly selected or enunciated principles, cases become mired in a useless mythology of such (anti-) heroic proportions that litigants are inevitably drawn to seek extralegal means to find peace.

Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

GETTING AHEAD IN DP /Donald J. Berardo‡

How to Defuse an Emotional Employee

The structure and environmental pressures of most corporations will not permit a free expression of emotions, particularly emotions that are highly charged with anger, tears and movement.

Unpredictable, emotional outbursts tend to disrupt the productivity and cohesiveness of the group and the individuals in it. Cooperation among DP project team members can disappear whenever one or more people are having difficulty controlling their emotions.

The DP manager will certainly experience this problem and must be ready to defuse such an explosive situation with appropriate sensitivity and skill.

Key to Understanding

A key to understanding any emotional episode at work is to realize that all such situations have complicated origins, are important to the individual and should never be taken lightly. Strong, emotional feelings are always valid to the person experiencing them. The first rule then becomes: Give appropriate credence to the employee's right to have such emotions.

If these feelings are questioned, criticized or ignored, they only increase in intensity. Such reactions to emotional outbursts also damage the DP manager's future ability to motivate such an employee because of the loss of self-esteem due to his embarrassment in the presence of co-workers. An emotional employee needs to know that it is okay to be human and that DP management understands his predicament.

Next, it is very important to allow the employee to fully express such feelings in an appropriate, private setting. As soon as possible, offer to listen sincerely to this person in the seclusion of a private office. Try to take notice of the context of the episode and the people involved. This can be an important clue to what or who triggered the outburst.

There is no need to delve too deeply into the psychodynamics of such a problem. It is important to try to pinpoint how the work place, co-workers and management are involved in the problem. Often, such feelings are related to a stressful home situation.

During the listening stage, show special care for the pain the person is expressing. Let the employee know that everybody has such feelings and problems at one time or another.

It is also useful to use touch and any other supportive measure that reinforces the process of complete expression and defusing. Although "hands-off" is usually the rule in business, physical contact can be soothing and reassuring in this sort of volatile situation.

After the employee leaves your office, take notes about the feelings expressed and keep this information confidentially stored. The DP manager must maintain this absolute confidentiality in order to build trust with such an employee and keep him from feeling stigmatized.

The ultimate resolution of such emotional outbursts may take several meetings to defuse completely and understand the origin of the episode. You may prefer to refer the employee to your company's employee assistance program, but only with the consent of the employee.

Continue to reinforce that DP management cares and will help the employee to get through this difficult period without stigma or reprisal.

Patience, time and concern work wonders.

Berardo is a management counselor and career therapist. He is a vice-president with the Meld Group in West Hartford, Conn., publishers of a monthly newsletter on management development.

It took years to learn how to save 80% on software costs.

We can teach you in five minutes.

The ReadyCode method: The most cost-effective means ever, of controlling your software investment.

To write and maintain one million lines of software code every year costs about $20 million. A startling fact, no matter how big your company is.

And if these assets aren't renewable, your investment is lost forever.

That's why Security Pacific Bank and Houghton Mifflin have changed over to the ReadyCode method, Raytheon's reusable software system.

Five years in development, this proven, one-of-a-kind technique can save companies from 60% to 80% on the total cost of designing, testing, and maintaining programs.

Here's how.

Raytheon ReadyCode software automates the program-design process by providing pre-written, pre-tested logic structures. Thereby cutting program development time by as much as 77%.

Only the new, application-specific code written for each program has to be tested at development time. And that code, and that code only, has to be tested during maintenance procedures.

This makes the ReadyCode method easier to learn and easier to use.

Further, the highly structured COBOL programs in the ReadyCode software means that any programmer can modify the program, no matter who originally wrote it, without having to start from the beginning.

So if you want your company to produce working application systems more easily and more effectively then ever before—while protecting your valuable software investment—find out more about Raytheon's unique ReadyCode software.

Write today for "The Book" on reusable software. Or call 1-617-431-7700.

RAYTHEON

Please: rush me "The Book" on the only fully reusable software. Raytheon's ReadyCode system.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Mail to: Director of Sales
Raytheon Computer Services
195 Worcester Road, Wellesley, MA 02181

CW 6/16/83

Raytheon Computer Services is a unit of Raytheon Service Company.

READER COMMENTARY

Some Ways MIS Managers Can Approach the

In less than a decade, the personal computer industry has achieved greater annual sales and installations than the 20-year-old minicomputer industry.

In light of such an unexpected and unprecedented growth spurt, management information systems (MIS) managers must support and endorse this new technology or risk having their objections overridden in internal meetings. The seemingly low cost of personal computers, along with a wide availability, makes this technology a difficult management issue for MIS operations.

By the end of 1983, the billion-dollar baby of the computer industry — the personal computer — will show annual sales 30% higher than minicomputers: almost $7 billion vs. $5 billion. And if that doesn't indicate enough trouble for the grandaddy minicomputers, hardware costs have been declining for years and now represent less than 20% of the total cost of computer operations.

It is important to note that personal computers must be approached in an entirely different manner from the one used for the staid minicomputers. No longer does the customer wait for the man in the three-piece business suit to walk through the door, touting results shown in charts and brochures. Computer advice is widely available; it can be found in fully stocked computer stores and in shopping malls. Meanwhile, MIS managers, who used to be the first authorities on productivity improvements, are sitting alongside the Maytag repairman.

Tremendous Challenges

MIS managers face tremendous challenges because of these trends. MIS is charged with the responsibility to improve overall productivity throughout a company, while continuing to control departmental costs. But MIS managers do not have to bury themselves in desperation because several alternatives are available to help them continue to meet their responsibilities through personal computer technology.

The first major alternative is in-house computer education classes. While this may seem ridiculous to some, consider the fact that some computer stores claim that they can have a user operating a new personal computer after one morning of training. Unfortunately, this approach is misleading because the new owner is probably not proficient to any degree. But this characterizes the marketplace as it is today.

MIS should keep in mind that new users do not need computer science degrees to make productive use of a computer. In fact, all they need is a brief introduction to this new world and some practical guidelines on how to proceed.

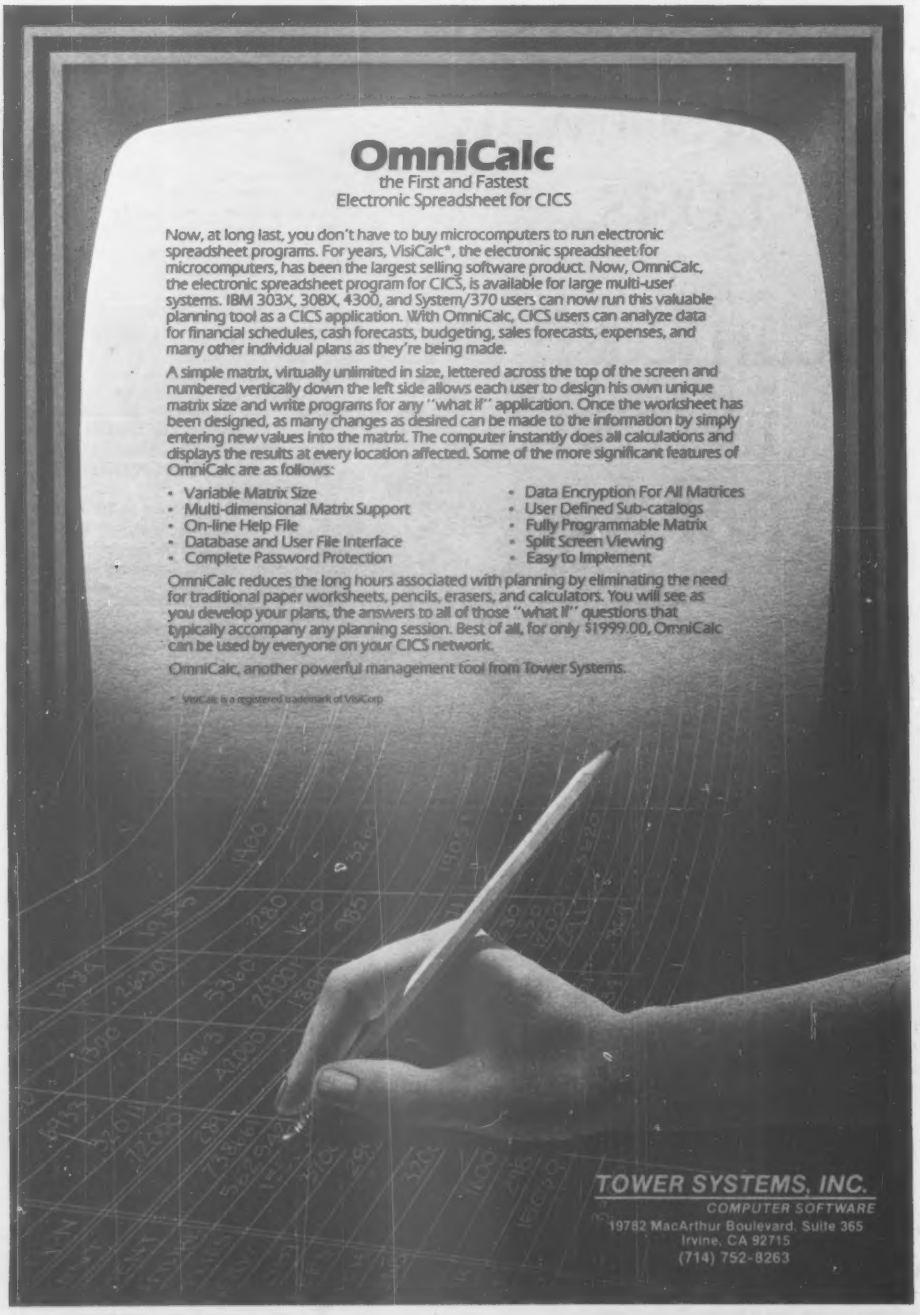
The solution? MIS can develop in-house computer education or engage consultants to offer several hours of training for users. During this session, they learn basically what a computer is, what a personal computer can and cannot do, and they leave with detailed road maps of how to understand their business problems so they can intelligently make a purchase.

What many MIS managers do not admit is that users sometimes know their responsibilities and applications better than MIS. However, MIS can provide the computer literacy that users lack, just as they have in the past. Providing this education in-house avoids an inevitable conflict with users who appear to have computer savvy. Otherwise, MIS is trying to give advice users cannot relate to because of their lack of legitimate computer knowledge. At the same time, MIS is helping users do what they are going to do anyway — buy personal computers.

Contracting with an outside consultant for this training lets MIS continue to focus on major applications with sizable returns to the company. Using a third party for this training also reduces any embarrassment to users for all the questions they want and need to ask. Furthermore, a third party can more easily tell users to do their homework and show them how to do it.

The next major alternative to consider is experimentation through the use of a young MIS employee. The personal computer is not a passing fad, so it is pointless to try to stop the erosion of existing smaller applications. Why not try to build an application that has broad company appeal?

Ask a young MIS employee to choose a personal computer, a potentially popular new application and a tight schedule to wrap up projects. Then direct him to complete the assignment by programming the application and demonstrating the results to a user to assure its completeness. Young people historically are more creative than diehards entrenched in company policies. Today, many


OmniCalc
the First and Fastest
Electronic Spreadsheet for CICS
Now, at long last, you don't have to buy microcomputers to run electronic spreadsheet programs. For years, VisiCalc*, the electronic spreadsheet for microcomputers, has been the largest selling software product. Now, OmniCalc, the electronic spreadsheet program for CICS, is available for large multi-user systems. IBM 303X, 308X, 4300, and System/370 users can now run this valuable planning tool as a CICS application. With OmniCalc, CICS users can analyze data for financial schedules, cash forecasts, budgeting, sales forecasts, expenses, and many other individual plans as they're being made.
A simple matrix, virtually unlimited in size, lettered across the top of the screen and numbered vertically down the left side allows each user to design his own unique matrix size and write programs for any "what if" application. Once the worksheet has been designed, as many changes as desired can be made to the information by simply entering new values into the matrix. The computer instantly does all calculations and displays the results at every location affected. Some of the more significant features of OmniCalc are as follows:
• Variable Matrix Size
• Multi-dimensional Matrix Support
• On-line Help File
• Database and User File Interface
• Complete Password Protection
• Data Encryption For All Matrices
• User Defined Sub-catalogs
• Fully Programmable Matrix
• Split Screen Viewing
• Easy to Implement
OmniCalc reduces the long hours associated with planning by eliminating the need for traditional paper worksheets, pencils, erasers, and calculators. You will see as you develop your plans, the answers to all of those "what if" questions that typically accompany any planning session. Best of all, for only $1999.00, OmniCalc can be used by everyone on your CICS network.
OmniCalc, another powerful management tool from Tower Systems.
* VisiCalc is a registered trademark of VisiCorp
TOWER SYSTEMS, INC.
COMPUTER SOFTWARE
19782 MacArthur Boulevard, Suite 365
Irvine, CA 92715
(714) 752-8263

Growing Popularity of Personal Computers

young people are entering the marketplace with a degree in one hand and eight years of computer experience, gained in high school and college, in the other.

Perhaps the most significant alternative available is one already known in another form. IBM is credited with establishing the information service center. MIS provides a limited staff of business/computer consultants to help users automate for themselves.

One should carefully design the charter of this group, establish user response-time guidelines and review staffing assignments carefully. This approach provides the best balance for MIS control vs. productivity improvement throughout the company.

Word of Caution

But caution is called for because this concept can be abused. It can become a hardware purchasing center without ever evaluating need or value. Or the staff at the center may not provide consulting, but focus on building a list of contacts and applications. However, through standard management practices, these pitfalls can be controlled and overcome.

The information service center can be used to provide in-house computer education training. In addition, the software industry has refocused its product development dollars to the end-user market, which means that more user-oriented products are coming.

The center has tremendous resources available and many more tools are being pushed onto the electronic marketplace thanks to the revolution and evolution of hardware and software price/capability.

In staffing this center, it is important to remember that the audience for these services consists of people who do not need enormous data base technology or worldwide interactive applications. If this type of application is truly justified, someone at MIS can easily be assigned as project leader.

Perhaps it is obvious that this organizational approach provides terrific productivity for MIS. Users who buy personal computers with or without MIS support are now getting support, while quality-control standards and some degree of expense control are maintained.

During the last three years, it has been widely reported that the computer faces a tremendous shortage of qualified people. In addition, people costs are the most significant in a computer operation. Some prognosticators have even predicted that by 1985, people costs could represent 80% of total costs.

If users could become skilled practitioners for their own small computer operations, MIS could avoid the problem of a wide shortage of skilled people, while continuing to help improve overall productivity.

The information service center represents the best of all worlds if it is carefully and thoughtfully managed by MIS.

There is no longer a shortage of people in the computer industry, because everyone is a potential computer user in the near future. Higher technology computer skills are still very much needed and will come from MIS staffs and college graduating classes. Personal computers will force software technology to keep pace and bring us lower total computing costs. Don't let this billion-dollar baby, the personal computer, run over your career when there are many advantageous ways to use it.

Butler is a computer consultant at Charles L. Kern, a certified public accounting firm in Camp Hill, Pa.

WELCOME TO NCC '83
TeleVideo Systems, Inc.
Computer Systems
Terminals
Start Here
If you're going to NCC to see the newest in computer terminals, 8-bit personal computers, 16-bit personal computers, mouse products, personal computer networks, integrated graphics, or application software, begin at the TeleVideo booth. Booth A3008, right at the Arena Entrance.
We don't think you'll need to go any further.

READER COMMENTARY/Lance Batten‡

The Two Faces of Microcomputers

The current debate over decentralized personal computers vs. centralized computing services has become the subject of editorializing rather than the subject of a frank investigation of the advantages and disadvantages of each. Microcomputer vendors have the fervor of the newly saved. Battle-scarred DP managers find themselves cast in the role of antitechnologists as they try to avoid a chaotic introduction of micros.

While the disadvantages of micros are real, the benefits they bring are great enough that some companies can neither plan an orderly transition to decentralized computing services nor decide to stick to the traditional, centralized data processing department. This reminds me of the ass who starves to death between two bales of hay because it cannot decide which to eat. Such nondirection will prove to be the worst decision.

In particular, Gabriel Goldberg's letter to the editor [CW, April 11] about the article "Rejection of Micros Draws Astonishment" [CW, March 28] warrants a response. First and foremost, the people who are trying to beg, borrow or steal microcomputers for their departments are reacting to a very real need for decentralized computer services. Many of these needs remain unfilled due to the staggering costs of professional programming projects and the (apparently) inevitable overloading of central DP departments.

User needs go unmet due to the inability of the user to express them or owing to user frustration at having done so badly in the past. Often, the company's finest managers will simply decide to end-run the DP department and knock off their applications to their own satisfaction using the unsophisticated software that accompanies the micros rather than battle for a place in the DP schedule.

This is not really bad news. Most of the tasks that they want done are highly individual and best developed interactively by the person who needs to use them. If the task is general, there probably exists a packaged solution available at a price commensurate with the cost of the machine. In either case, the job gets done without endless meetings, proposals, evaluations and memorandums. For the smaller tasks to which micros are suited, flexibility and low management overhead are essential if they are to be cost-justified.

Drained by Demands

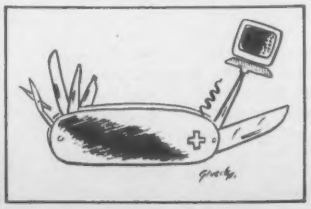
Unfortunately, a DP department can easily be drained by the demands for education, help, advice and equipment since each user who runs into trouble will inevitably turn there for help. Decisions made in isolation can easily result in a huge collection of incompatible equipment, software, data and floppy diskettes.

The innocent microcomputer budgeted with the calculators can end up swallowing enormous resources in personnel, peripherals, media and duplicated efforts. Management has discovered department salesmen doing mass mailings on copied diskettes. Managers have found themselves arguing violently over points that could be traced to outdated spreadsheet data. It's funny to tell the stories, but less pleasant to live them.

So why get involved in the mess? Are the heretics right in saying, "Thou shalt not purchase micros"? It is a little like trying to resist the introduction of the telephone on the grounds that telephone calls can be a terrible interruption. Those who have used the personal computer can (and will) tell of their triumphs. The strong demand for personal computing facilities is fueled by the simple fact that those who use them are succeeding and advancing because of them.

Among serious business users, the demand is not so much for personal computers as for personal computing. Most people prefer not to clutter their desks and their lives with cables, floppies and printers. They will pay the price for access to the personal, interactive software that runs on these machines. The best solution for them lies not in a blanket refusal to satisfy their demands, nor in allowing personal computer fans to hang themselves on their own inexperience. The DP manager who skillfully integrates microcomputers and minicomputers in a rationally planned system will be able to point to his achievements when budget time rolls around.

Batten is vice-president of Virtual Microsystems, Inc. in Berkeley, Calif.



The Second Revolution in Human Resources Software Continues!

Phase II.
Genesys
Telecommunications.

Genesys Telecommunications. For efficient management of Human Resources in multi-site environments.

Now you can have a distributed processing capability throughout your local or national network. For centralized control of remote sites. Or independent site operation with centralized access.

Genesys Telecommmunications. It will revolutionize the acquisition, analysis and administration of all your payroll, personnel and deferred benefits information.

Now you can hire an employee in Atlanta, run your payroll in Chicago, print your checks in L.A. and administer benefits from New York. All on one integrated system. Plus receive on-line customer service from your nearest Genesys office within minutes.

Genesys Telecommunications is remarkably simple. For IBM systems, information and operation are, literally, at the touch of a button.

The Second Revolution in Human Resource Management Systems will change how you manage your business. It will make you want to take a very close look at Human Resources software. To learn more, watch for our upcoming ads.

Better yet, give us a call and we'll *show* you with an on-line demonstration right in your office.

Using Genesys Telecommunications, of course.

Genesys, 10 Grafton St., Lawrence, MA 01843
Please send me your brochure on these Genesys packages: AT-12
☐Payroll ☐Personnel
☐Benefits Management
Name _____
Title _____
Company _____
Telephone _____
Street _____
City _____ State _____ Zip _____
IBM Hardware _____

Genesys
SOFTWARE SYSTEMS, INC.

For the State of the Art in HRMS
LOOK TO GENESYS FIRST!

Genesys, 10 Grafton St., Lawrence, MA 01843 (617) 685-5400

IBM Info Net Takes Middle Spot

Study Analyzes Remote Computing Costs

STAMFORD, Conn. — In a study comparing the costs of using remote computing services, the year-old IBM Information Network was revealed to be positioned in the middle of its competition — at least from in terms of CPU costs. In comparisons based on hardware groupings, Control Data Corp. (CDC) and Digital Equipment Corp. Decsystem-20 services shared equally in low-cost honors for CPU costs.

These results were reported by Real Decisions Corp. (RDC) in its 1983 edition of "Time-Sharing Decisions," a report that compares the costs of using remote computing services on the basis of 23 benchmark runs designed to test I/O data handling capabilities and computational power. This year's report includes 40 services, eight more than last year.

The 23 benchmarks were coded in Fortran, Basic and Cobol and individually run on each of the time-sharing services. As a summary analysis, 33 of the 40 services were then divided into six major hardware groups — CDC, Decsystem-10, Decsystem-20, Honeywell, IBM CMS and IBM TSO — to compare the relative average CPU costs of the benchmark runs. At least four services comprise each of these categories.

The IBM Information Network's Conversational Monitor System (CMS) service ranked fifth among nine CMS-based ser-

(Continued on Page 104)

VENDOR	REPORT REFERENCE	HARDWARE
ADP Network Services, Inc.	ADP	DEC-10
American Management Systems	AMS	DEC-20
Boeing Computer Services		
• Mainstream - CTS	BCS/CTS	IBM
• Mainstream - EKS	BCS/EKS	CDC
• Mainstream - TSO	BCS/TSO	IBM
Chase Econometrics/Interactive Data Corporation	CE/IDC	IBM
Citishare		
• DEC Service	Citi/DEC	DEC-20
• Honeywell Service	Citi/Honeywell	Honeywell
Computer Sciences Corporation		
• CSVS CMS Service	CSC/CMS	IBM
• CSVS TSO Service	CSC/TSO	IBM
• CSTS Univac Service	CSC/CSTS	Univac
Comshare, Inc.		
• CMS Service	Comshare/CMS	IBM
• CRC Service	Comshare/CRC	IBM
• XDS Service	Comshare/XDS	Xerox Sigma 9
Control Data Corporation	CDC/175	CDC
Control Data/Business Information Services	CD/BIS	IBM
Data Resources, Inc.	DRI	Burroughs
DTSS, Inc.	DTSS	Honeywell

Some Participants in "Time-Sharing Decisions – 1983"

MPG Offers Link for Ramis II, SAS Institute's Analysis Aids

PRINCETON, N.J. — Mathematica Products Group, Inc. (MPG) has announced an interface that operates between its Ramis II fourth-generation language and data base management system and SAS Institute, Inc.'s statistical analysis software products.

SAS Interface allows access to data from Ramis II, Software AG of North America's Adabas, IBM's DL/1 and IMS, Cullinet Software, Inc.'s IDMS and Cincom Systems, Inc.'s Total data bases and from IBM Isam, Vsam and sequential files. Data is enhanced with Ramis II components and given to SAS for analysis, the vendor said.

Users can summarize, extend, sort, weigh or conduct character of numerical manipulations of any or all data items prior to statistical analysis, a spokeswoman said. The interface allows output to be routed to a terminal, printer or disk.

Features of the software interface include full prompting and on-line Help facilities. Procedures that can be accessed include descriptive statistics, correlation and regression analysis, stepwise regression, factor and seasonal analysis, cross-tabulation and exponential smoothing projections.

The product runs under IBM's VM/CMS and MVS/TSO operating systems and costs from $1,000 to $2,000 from MPG, through P.O. Box 2392, Princeton, N.J. 08540.

CICS Version Out Of Freight System

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has introduced an IBM CICS version of its freight rating and routing system said to perform the same functions as the IMS version, but executed under different software for companies using IBM's CICS facility.

McAuto Freight clients may process on McAuto computers or install the system on their own hardware (IBM 4300 series or larger). The new version uses IBM's CICS communications with IMS.

The CICS version is base-priced at $150,000. An Extended Analysis Module priced at $90,000 is available in a CICS version from McAuto, through P.O. Box 516, St. Louis, Mo. 63166.

Three Reasons System/Manager Stands Alone

No other DOS/VS(E) resource management system comes close to Corodale's System/Manager for overall ease of use and hardware efficiency. It's the complete resource manager. Because of three perfectly integrated components.

Space/Manager

Improves disk space and disk file control. Increases capacity by up to 50%.

Tape/Manager

Controls tape allocation and usage. Minimizes clerical time, ensures security and integrity.

JCL/Manager

Reduces job stream set up and maintenance. Streamlines operational efficiency and throughput.

In just 15 minutes, System/Manager can be up and running, paying for itself. And its modularity means you won't outgrow it, it won't outgrow you. We'll even let you prove all this in your own environment for a full 27 days.

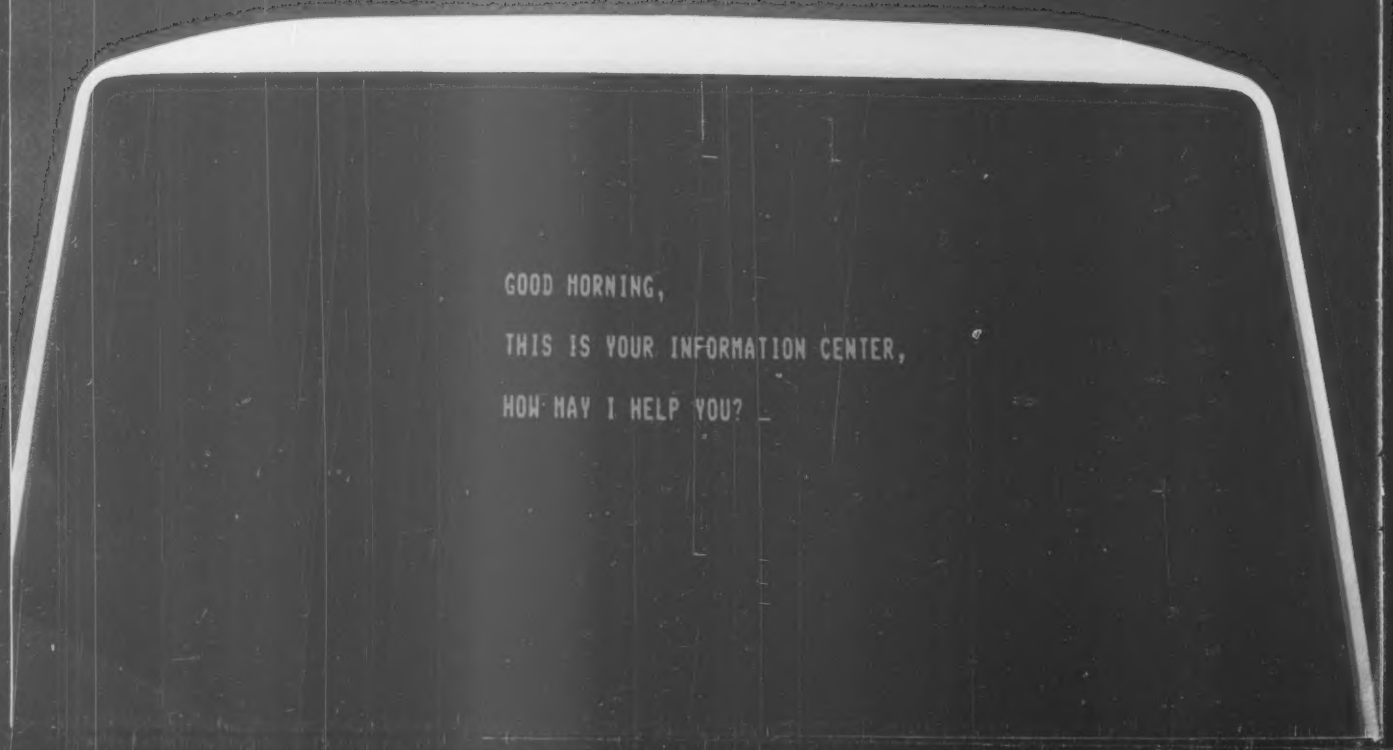
Write or call for our Cost Analysis/Justification Worksheet and detailed information.

211 Congress Street
Boston MA 02110
617 · 426 · 8780
TLX 710 · 3216747

Offices in Boston, Chicago, Montreal. Also in London, Amsterdam, Dusseldorf, Helsinki, Sydney, Manila.

C/ Corodale Incorporated / Systems Software

HOW TO GET USERS OFF YOUR BACK AND ON YOUR SIDE.



The answer is in front of you.

SYSTEM 2000.®

Intel's Database Management System.

And iDIS.™

Intel's Database Information System.

Together, they allow your corporate decision makers to gather all the information they need.

From your information center data base.

Not from their personal computer.

And users get their data from a terminal. Right in their office. Right on their desk. In seconds.

Versus the days it might take you, just to get to their request. Days that can seem like weeks.

Especially when management is breathing down your neck.

iDIS is a fully integrated, XENIX* based, multi-user microcomputer system. Featuring the Intel 86/735 microcomputer-based system. The most versatile, most powerful 16-bit system on the market.

Industry-standard VLSI and peripheral technology are also designed-in, to protect your long-term investment.

And to protect your information from unauthorized use, iDIS maintains complete data security at every terminal.

iDIS gives users the ability to perform local database definition and creation, as well as updating and reporting.

But iDIS doesn't stop there. Users also get a wide range of software, to aid them in planning, analysis and office management.

iDIS even has tools for data processing. By using the XENIX command interpreter, menu/forms and conventional programming languages, programmers can create custom applications for users.

Credit our spreadsheet, with quick numbers directly from the corporate data base.

For ease-of-use, our menu format is made-to-order.

Faster than management can send you a data request.

And while iDIS is helping you, SYSTEM 2000 will be helping users to help themselves.

By creating greater user self-sufficiency and increased productivity. Producing better control of information, for higher quality decisions.

Call us toll-free, for more information. (800) 538-1876. In California, (800) 672-1833.

Or write us. Lit. Dept. H 14, 3065 Bowers Avenue, Santa Clara, CA 95051.

Or contact the Intel Sales Office nearest you.

We'll back you, with all the support you'll need.

To get users on your side.

*XENIX is a trademark of Microsoft, Inc.

intel® delivers solutions

See us at NCC, Booth #3910.

'Genprep-1,' 'Genedit-1' Serve IBM OS, DOS

CHICAGO — Miroda Software Engineering has announced two products for use with IBM OS and DOS operating systems.

Genprep-1 is a general-purpose language preprocessor that provides character string and numeric variables, execution control statements, recursive macros and the ability to invoke user-written subroutines.

The package produces a tailored executable job stream from any number of job control files and macros in which Genprep-1 control statements and preprocessor variables have been incorporated, a spokesman said. The facility eliminates much of the manual intervention required to execute production job streams.

Genedit-1 is a general-purpose editor that utilizes facilities provided by Genprep-1 to control and modify editor command files. The editor provides the ability to insert selectively, delete and modify any number of lines in a target file, the vendor spokesman said.

Any preprocessor variable may be set with any portion of a line from the target file. The variable may then be used to control the execution of the editor command file, according to the vendor spokesman.

A permanent license costs $4,000 for both products with a 10% discount until July 1 from Miroda, which can be reached through P.O. Box 10089, Chicago, Ill. 60610.

IMF Tool Pinpoints Poor Response Cause

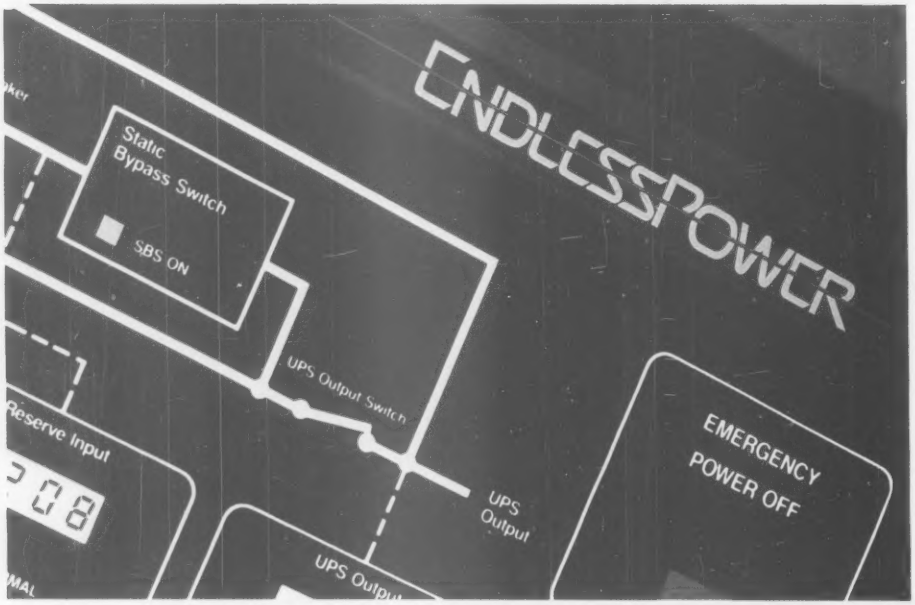
SUNNYVALE, Calif. — A real-time tool for analysis of work load degradation in IBM's IMS data base management system has been introduced by Boole & Babbage, Inc. Called IMS Management Facilities (IMF)/Workload Analyzer, the product provides information for pinpointing the cause of poor response time.

The package tracks individual transactions as they pass through the major events within IMS, a spokesman said. It views 283 states in which a transaction can exist. The Wait Display identifies critical resource bottlenecks, including physical and logical resources. The Detail Transaction Trace capability shows work load events in an on-line display.

A second component, called IMF/Resource Analyzer, investigates total system activity against the problem resource identified by the Workload Analyzer. The package runs under IMS Release 1.1.6 and above and is priced at $20,000 from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

© 1983 International Power Machines Corporation

Introducing the uninterruptible power supply so sophisticated it corrects itself.



We call it ENDLESS POWER. And it's unlike any other uninterruptible power supply (UPS) available. Because only ENDLESS POWER uses MOSFET power components in the power-critical inverter. If a failure occurs in any one of them, the system automatically isolates it and continues to supply full power to the computer. No other UPS system can claim that reliability advantage. And that's why our MTBF is 5.6 years.

As a result, you'll never have to rely on unreliable raw utility power to maintain normal operation.

Instead, you'll be able to depend on 100% conditioned power, 100% of the time.

Nor will you have to worry about time-consuming repairs. Or about expensive and complicated installation. ENDLESS POWER produces one-tenth the noise of other UPS systems, so it can be located on or near the computer room floor.

Equally important, ENDLESS POWER produces 25% less heat. That lowers energy costs, typically saving $50,000 over 5 years.

Plus there are other advantages, too numerous to mention.

Make no mistake about it. Whether you need 60Hz or 415Hz, there's only one UPS so technologically advanced, its advantages are – endless.

To give your computer ENDLESS POWER, call or write: International Power Machines, 11534 Pagemill Road, Dallas, TX 75243 U.S.A. 1-800-527-1208.

International Power Machines

Clip and mail to:
International Power Machines
11534 Pagemill Road
Dallas, Texas 75243

☐ Please send more information ☐ Please have a representative call me.

Name Title

Company

Street

City State Zip

Phone Computer

Subroutines Aid DEC Programs

CHICAGO — Olamic Systems Corp. has announced Attain, a collection of subroutines that enables Cobol and Fortran programs to call data entry screens that have been created with the screen formatting functions of the company's Demand 92 data base management system. The product runs on Digital Equipment Corp. Decsystem-10 and Decsystem-20 computers and Demand 92 screen formatting functions are included, a spokesman said.

The end-user-oriented, interactive screen design system allows the creation of multipage screens. A language called Logic 92 features string manipulation facilities and allows for field validation more easily than Cobol or Fortran, the spokesman claimed. A set of subroutines permits information displayed or entered on the screen to be accessible to programs.

The package reduces the time needed to generate data entry screens and reduces machine overhead, the spokesman said. It costs $9,900 from 141 W. Jackson Blvd., Chicago, Ill. 60604.

MCBA Offers 15 Packages

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has released 15 accounting, distribution and manufacturing packages written in Dibol for Digital Equipment Corp.'s VAX-11/730 and 11/750 superminicomputers.

The packages are accounts payable, accounts receivable, base material requirements planning, bill of materials processor, customer order processing, fixed assets and depreciation, general ledger, inventory management, job costing, payroll, purchase order and receiving, report writer, shop floor control, standard product costing and standard product routines.

The packages use the Macro-Sort assembly language, and all support system spooling as well as disk file spooling. The customer order processing package utilizes IBM Isam files to speed order processing.

Fees range from $1,500 to $4,000 per package from MCBA at 2441 Honolulu Ave., Montrose, Calif. 91020.

MBI Tool Allows Shorthand Access To CICS Modules

PLYMOUTH, Minn. — MBI Systems, Inc. has announced Kwik, a product for IBM CICS systems that is said to allow communications with CICS modules in a shorthand method.

Kwik opens and closes files, controls terminal status and inquires on tasks. No modifications are required to the IBM software. The product is available in assembler code for IBM's DOS/VSE and MVS operating systems using Release 1.5 of CICS.

Kwik is offered for a one-time license fee of $45 for a limited time, a spokesman said from Suite 100, 3030 Harbor Lane, Plymouth, Minn. 55441.

Management System Fits VAX-11

GOLETA, Calif. — Signal Technology, Inc. has announced Smartform, which it described as a Digital Equipment Corp. VAX-11 data management system that integrates the standard forms management system concept with a query language.

Functions like painting forms data entry structure, defining the VAX-11 RMS file structure and general query processing of records can be performed without writing program code, a spokesman said.

The "paint and process" capability consists of a forms design tool (FDT) and forms query language (FQL). FDT reportedly allows painting of the forms and supports capabilities like keypad editing similar to the VAX-11 EDT editor and automatic creation of data files matching the form definition.

FQL implements a key-optimizing general query processor capability, the spokesman said. The user can define which records are to be retrieved, for example, by filling in any combination of desired fields and then pressing the Retrieve key. FQL also supports a wild card capability for single and multiple characters, basic query operations and specialized operations.

Users can directly access VAX-11 RMS query processing routines through a call interface. Subroutines support multiuser general query access with concurrency control to ensure integrity, the spokesman said.

The package is supported on all VAX-11 operating systems with Version 3.1 or above and for all DEC VT100-compatible terminals. Introductory price for FDT and FQL is $4,200, with the call interface option priced at $2,800 from 5951 Encina Road, Goleta, Calif. 93117.

Documentation Package Enhanced for System/34

NEW YORK — REM Associates has announced Release 3 of Remdoc, an IBM System/34 documentation package.

The new release features a precollated run book that merges nested procedures, flowcharts, operator messages, file usage, print and screen layouts in actual execution sequence by menu or procedure, a company spokesman said. Source and procedure narratives can be maintained with an on-line program and automatically merged into the run book.

A data dictionary can be automatically generated and then updated on-line to add field descriptions. File, input and output specs can be produced directly from the data dictionary source member, the spokesman noted.

The package provides more than 20 reports integrating source and procedures from up to 30 libraries. The Release 2 price has been reduced to $600 with a free upgrade to the new release, which will be available September 1 from REM Associates, Box 527, Village Station, New York, N.Y. 10014.

Athena Offers WP Capabilities For Text Editor

EL CAJON, Calif. — Athena Software Services and Consulting Ltd. has announced an enhancement to its full screen text editor for Honeywell's Level 6/DPS 6 MOD400 systems.

FSTE-6/Plus features word processing capabilities that are said to enable current FSTE-6 users to utilize their terminals as word processing workstations.

FSTE-6/Plus features left and right text justification, automatic word wrapping, adjustable column length and paragraph reformatting, as well as underscoring, boldface, overtype and automatic pagination, according to a spokesman for the vendor.

Text effects reportedly appear on the screen using high/low intensity and reverse video terminal capabilities. FSTE-6 also includes a print facility and is compatible with all Honeywell CRTs, the vendor spokesman maintained.

FSTE-6/Plus carries a one-time license fee of $2,245. The upgrade alone costs $250.

More information is available from CDP Consultants, 1700 Circo Del Cielo Drive, El Cajon, Calif. 92020.

This announcement is neither an offer to sell nor a solicitation of an offer to buy these securities. The offer is made only by the Prospectus.

$250,000,000

COMDISCO, INC.

8% Convertible Subordinated Debentures Due May 1, 2003

(Interest Payable May 1 and November 1)

The Debentures are convertible until maturity, unless previously redeemed, into shares of Common Stock of the Company at a conversion price of $36½ per share, subject to adjustment in certain events.

Price 100%

plus accrued interest from May 1, 1983

Copies of the Prospectus are obtainable in any State from the undersigned and such other dealers as may lawfully offer these securities in such State.

Drexel Burnham Lambert INCORPORATED

Smith Barney, Harris Upham & Co. INCORPORATED

April 28, 1983

Six Programs to Assist Info Managers

Consultants Unveil Problem Solution Package

HOUSTON — Walter E. Ulrich Consulting has announced the Problem Solution Package of Services, six separate programs designed to assist information managers with their most critical problem areas.

The six programs are:

- Backlog Reduction Program.
- Technology Advisement Program.
- Productivity Improvement Program.
- Problem Resolution Program.
- Personnel Enhancement Program.
- Personal Computing Program.

The Backlog Reduction Program is designed to help managers reduce their backlog of application programs. The Technology Advisement Program will assist in keeping current with information, communication and office technologies. The Productivity Improvement Program is intended for managers who must continue to provide high service levels while facing budgetary restrictions. The Problem Resolution Program is aimed at solving the underlying hardware, software and management problems facing the management information systems director. The Personnel Enhancement Program addresses an organization's intermediate and long-term needs for qualified personnel. The Personal Computing Program provides guidance on establishing end-user computing facilities for end users.

The vendor has organized a Problem Specification Analysis (PSA) team composed of managers and consultants. One or more team members is assigned to a client for from three days to a week to perform the PSA.

The charge for this component of the service is $3,000, plus expenses. Any additional services requested by the clients will be charged on a time and materials consulting basis, according to the vendor at Suite 450, 2626 S. Loop West, Houston, Texas 77054.

You Never Know What Your End-User Is Going To Want Next

It could be just one more report, just one more screen menu, or just one more graph. But if you're running NOMAD2™ on your in-house machine, you'll be ready for them no matter what they want. NOMAD2 is the software element of the NOMAD2 INFORMATION CENTER service which consists of: NOMAD2, the most powerful 4th generation language/DBMS currently available; support staff training, product education, documentation and product support; and of greatest value, our 16 years of experience in delivering end-user computing.

NOMAD2 is widely recognized in the industry as the premier end-user oriented software product. Its report writer is unsurpassed and its graphic capabilities, relational properties and broad spectrum of built-in functions allow it to fully respond to end-user needs, no matter what those needs are. The in-depth training and support materials are exactly those used to support our NOMAD2 timesharing based business. Whether you're currently running an information center, or just thinking about setting one up, examine the options available to you and then talk to us. And the next time someone asks you how you respond to your end-users, tell them you do it with your in-house time-sharing business running NOMAD2.

For further information call Charles Graham at (203) 762-2511, or write to:

N2IC, National CSS,
187 Danbury Rd.,
Wilton, CT 06897

NOMAD2 *Information Center*

Experience the difference

National CSS

a company of The Dun & Bradstreet Corporation

Wang Offers Monitor Tool For VS Line

LOWELL, Mass. — Wang Laboratories, Inc. has announced System Activity Monitor (SAM), an interactive, menu-driven performance tool for the Wang VS product line that is said to enable users to fully analyze system capacity, measure existing performance levels and plan for future system resource requirements.

SAM allows users to maintain system performance by scheduling programs according to their frequency and system use. Users can obtain a graphics display of particular sections of program code that require reworking. They can also evaluate current system functionality for use in determining future operating requirements.

Four functions are accessible through the SAM main menu, allowing examination of task statistics of the overall system as well as CPU, disk and memory activity. They are: task statistics and profiles, task status and CPU utilization, disk status and utilization and memory status and utilization.

SAM runs on the VS 25, 45, 80, 90 and 100 systems and costs $1,000 from Wang at One Industrial Ave., Lowell, Mass. 01851.

For CICS/DOS/VS(E)
Inter-Partition Command Processor (IPCP)

IPCP opens and closes CICS files from batch partitions with a single execute statement.

- enable/disable transactions
- and many other CSMT functions
- eliminate PAUSE statements
- keep CICS up 24 hours
- free 30 day evaluation period
- $950 one time or $48/month

J. W. LAMPI, INC.
6160 Benjamin St. NE
Minneapolis, MN 55432
(612) 571-3934

Comshare's DSS Gets Graphics, Forecasting

ANN ARBOR, Mich. — Comshare, Inc. has added integrated color graphics and statistical forecasting to its System W decision support system. System W runs on IBM mainframes under VM/CMS. A distributed version of System W links the mainframe package to the firm's Micro W software that runs on the IBM Personal Computer.

System W graphics allows charting of data from multiple dimensions of a company's data, such as line items vs. time by product, company division, geographic location or distribution channel. The new version of the product supports a variety of color-screen terminals, hard copy and 35mm slide-making devices.

Statistical forecasting features that have been integrated within System W include regression analysis, curve filling, descriptive statistics and histograms, the vendor said.

Color graphics and statistical forecasting are said to be the first of a series of planned additional features to System W. These functions are available immediately and will be provided free of charge to current System W users. The core package of System W is available for $55,000. System W Plus, which supports nine dimensions and 2,000 members per viewpoint, is priced at $75,000. System W Distributed, which includes two copies of Micro W, is available for $80,000. Additional copies of Micro W are priced at $995 each.

The vendor is located at 3001 S. State St., Ann Arbor, Mich. 48106.

Application Development System Unveiled

PHOENIX — Software Systems Marketing, Inc. has introduced an application development system combined with a relational data base management system for use with Data General Corp.'s DOS, Rdos, AOS and AOS/VS operating systems.

Consisting of over 200 programs, the Software Machine is an English language-based, menu-driven information management and application development system. The software features screen and report generators, a data dictionary, automatic relational file structures and an English query language with Boolean capabilities, the vendor said.

The Software Machine ranges in price between $9,000 and $24,000, depending on the operating system used. More information is available from the vendor at 4201 N. 16th St. No. 210, Phoenix, Ariz. 85016.

Prices Increased On Product Trio For VM Systems

ARLINGTON, Va. — VM Systems Group has announced price increases of 15% on three of its products for IBM VM systems. The increases will be effective June 1.

V/Quick is said to shorten VM/CMS "trivial" response time by speeding up paging for the interactive user. The new price is $5,740.

V/Snap gives a command that takes a dump produced by a hardware restart but without causing a system failure. It will cost $1,370.

V/Safe allows system operation to continue through most abend conditions without noticeable disruption, a spokesman said. It will cost $1,370.

VM is located at 3123 N. Military Road, Arlington, Va. 22207.

'IDA' Tool Out For System/38

WEST SPRINGFIELD, Mass. — New England Systems, Inc. has introduced an Interactive Documentation Aid (IDA) package for the IBM System/38.

IDA provides the capability to selectively produce standard documentation reports consisting of file record format layouts for physical, logical and display files, program file cross-reference listing and program narratives, according to a vendor spokesman.

Users can interactively produce system and program flowcharts utilizing a collective combination of International Standards Organization, American National Standards Institute and IBM flowcharting symbols, the vendor said.

Flowcharts are composed on-line, allowing inclusion of comments and function identifications, a spokesman said.

IDA reportedly also produces a printed listing of the user-composed system/program flowchart, the vendor said.

Documents can be produced by standard 132-char. IBM printers or letter quality printers, the vendor said.

The system is available at a licensed fee of $250.

New England Systems is located at 59 Interstate Drive, West Springfield, Mass. 01089.

IMS ENHANCEMENT SERIES

LOGPLUS provides fast, efficient, automatic IMS restart. Operator intervention is reduced to a start command. LOGPLUS also makes IMS online log tapes obsolete by writing to disk and managing their constant reuse. LOGPLUS is proven in over 150 installations worldwide.

LOGPLUS

"Logplus reduces IMS restart time while eliminating operator intervention."
—WAYNE WEIKEL
BMC Product Development

The 3270 OPTIMIZER compresses IMS messages. Most users report 25% or more compression. Shorter messages mean reduced line utilization and faster response time. Hundreds of installations worldwide.

3270 OPTIMIZER

"The 3270 Optimizer reduces line utilization for faster response time."
—DAN CLOER
BMC Product Development

SCREEN PLUS generates error-free MFS source in minutes from scratch, other MFS source, or format library. Preview screens before creating MFS blocks. SCREEN PLUS... MFS source your user wants—the first time.

SCREEN PLUS

"Screen Plus generates MFS source in minutes."
—DON ODOM
BMC Product Support

Please contact me with more information on:
☐ LOGPLUS
☐ 3270 OPTIMIZER
☐ SCREEN PLUS

Clip and Mail to:
BMC SOFTWARE
P.O. Box 2002
Sugar Land, Texas 77478

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____

BMC SOFTWARE
P.O. Box 2002
Sugar Land, Texas 77478
(713) 491-8800
Telex 77-4132 (FLECKS HOU) ATT BMC

In Australia and New Zealand Contact
AMDAHL DIVISION FAL
27 Palmerston Crescent
South Melbourne 3205
Phone 690 7322 Telex AA 35201

Application Program Generator Out for DEC

CORAOPOLIS, Pa. — Information and Systems Research, Inc. has announced an application program generator for Digital Equipment Corp. computers using DEC's Dibol and/or DBL under DEC's RT-11, TSX-Plus, RXS-11M, RSTS/E and VMS operating systems.

Called Rims/MPG-Plus, the package consists of eight key software modules and seven program generating modules which can be used to produce programs and source code for data entry, reports, sorts, transaction processing, graphics, menus and file reorganizations, a spokesman said.

Applications are generated by answering questions posed by Rims/MPG-Plus.

The dictionary module features multiple keys, redefine capabilities and hierarchical level grouping. Capabilities include partial key lookups, search on alternate keys and the ability to employ data types other then alphanumeric. Users can specify multiple dictionaries for the same data files.

Cross-reference chaining capabilities permit multiple data files to be accessed simultaneously. Any key data element can be subdivided into multiple contiguous data elements, thus defining a "split key," the spokesman said.

Repetitive definitions of a single data element can be created for subsequent use as a table or array.

Rims/MPG-Plus also allows for a number of data value and dictionary integrity checks to be performed both during and after dictionary definition. Multiline report headers can be defined in the dictionary in order to conserve space on reports.

If ordered before June 15, a license fee costs $5,000 for RT-11, CTS-300 and TSX-Plus; $7,500 for RSTS/E, CTS-500 and RSX-11M; and $10,000 for VMS.

Prices will increase between 10% and 15% after June 15, the vendor said from Building One, Airport Office Park, 410 Rouse Road, Coraopolis, Pa. 15108.

Translator Program Converts Basic From Basic Four to HP

NEW YORK — Madlon Software Enterprises, Inc. has announced its translator and system packages for conversion from Basic Four Corp.'s Basic to Hewlett-Packard Co.'s Basic.

The translator program is written in HP Basic 3000 to run on any HP 3000 computer. The text of the Basic Four programs is first moved to the HP computer through telecommunications or on magnetic tape. The translator reads the programs as data and converts each line of Basic Four Code to an equivalent line of HP Basic code, a vendor spokesman said.

The file system is similar to the Basic Four file system, featuring direct, indexed and keys-only files. Variable length fields are allowed within records, and type mixing is also allowed. Up to 32 files can be opened at the same time, according to a vendor spokesman.

Madlon Software is located at Suite 1500, Two Penn. Plaza, New York, N.Y. 10121.

DBMS Unveiled For DEC PDP-11, VAX-11 Systems

DAYTON, Ohio — A data base management system (DBMS) for Digital Equipment Corp.'s PDP-11 systems running under RSX-11M and RSTS/E and VAX-11 systems running under VMS has been introduced by Data Base Software and Logic.

Amegatrim features interactive and batch access, report generation, nonprocedural English-like commands, data base reorganization and redefinition and transfer of data between data bases.

The package is priced between $1,500 and $4,000. The vendor can be reached through Box 53, Dayton, Ohio 45420.

Spreadsheet Targets IBM

FALLS CHURCH, Va. — Dexel Systems Corp. has announced a spreadsheet package for IBM's System/34, said to allow the user to perform basic spreadsheet processing.

The package features: spreadsheets of up to 26 col. by 70 rows; variable column widths, user-defined from one to 30 positions; full-screen spreadsheet display; spreadsheet print function; and formulas that may include add, subtract, multiply and divide operations, as well as references to other cell values, up to nine levels of nested expressions and four special cell commands.

The package costs $195 from Dexel Systems at 5203 Leesburg Pike, Falls Church, Va. 22041.

New for VAX

DBMS Bliss

Now there's software that users can use, programmers can program, and managers can manage.

Don't despair. If you've been frustrated waiting for ideal data management software, your worries are over.

The answer is System 1032™ DBMS for your VAX. And you can sample it at no risk or obligation. Here's the story.

Responsive Assistant

System 1032 provides a common-sense relational approach to data management, without the burden of relational calculus or SQL. Users easily grasp both simple and complex data relationships, and assistance is right at their fingertips. Special function keys make it easy to complete commands, quickly learn new ones, and see explanations of options and parameters, even in mid-command. So there's no need to struggle with a manual in the lap or consult an already-hassled wizard.

Best of all, System 1032 is fast and pretty. It answers complex queries almost instantly and produces presentation-quality reports with single commands.

Designer's Delight

Don't think it's a toy, though. Sophisticated applications designers can program in any VAX language, including System 1032's built-in block-structured language, and still access all of System 1032's powerful data management tools. A complete range of data types, format definitions, shared data structures, and other advanced features ensure that System 1032 easily satisfies the most demanding needs.

If you're a manager, you'll especially appreciate System 1032. Your users and programmers all use the same unified command language and data base concepts, so communication between them is easier than ever. And System 1032's careful human engineering drastically cuts your training costs and increases productivity.

Plus we exploit the best of the VAX architecture with shareable native code, asynchronous I/O, and proprietary inverted files—efficiently! So, unlike other software, System 1032 won't force you to buy more memory, disk space, or CPUs.

Risk Free

Software House has an impeccable decade-long reputation for reliable software and responsive technical support. System 1032 is the offspring of System 1022,® the most widely used DBMS for DEC mainframes. Its step-oriented commands and relational design have proved themselves in years of use at hundreds of sites. And System 1032 has undergone extensive field-testing to ensure that it works right the first time for you. Although new, System 1032 is already the most mature DBMS available for your VAX.

Convince yourself. Try System 1032 on your own VAX with your own data, free for 60 days. Verify our claims, browse through our manual, and test our hot-line support service. Compare and benchmark System 1032 against other software, relational or not, at whatever price. Then sit back in bliss and watch your end users and programmers accomplish more, faster than you thought was possible.

So don't delay. Call us today, or send in the bliss coupon.

© Copyright 1983, Software House. System 1022 and System 1032 are trademarks of Software House. VAX is a trademark of Digital Equipment Corporation.

☐ Please call me.
☐ Send me the latest on System 1032.

My VAX environment is:

☐ 11/782 ☐ 11/730
☐ 11/780 ☐ On order
☐ 11/750 ☐ Under consideration

Name _____
Title _____
Company _____
Address _____
City _____
State/Prov _____ Zip/PC _____
Tel _____
CW516

Send to:
Betsy Ziegler
Software House
1105 Massachusetts Avenue
Cambridge, Massachusetts 02138
Tel: (617) 661-9440

Software House

Visit us at DEXPO® St. Louis May 22-24

SAS...

Performance Tools for Every IBM 370 Operating Environment

SAS®—always a leading performance measurement tool for IBM OS users—now offers VM/CMS, DOS/VSE and SSX users the power and flexibility of the SAS System.

You get a twofold advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze performance statistics without formal training. SAS programs for reducing VM Monitor data and VSE Power accounting data are included with each installation tape. You can use these SAS programs to produce summary reports of key performance variables, user resources and system work loads. To print the reports, you can take advantage of the color charting, plotting and mapping capabilities in SAS/GRAPH™ or use the line printer reporting facilities in SAS.

In addition to routine performance and accounting reports, the SAS System provides extensive data management and retrieval tools, combined with a sophisticated macro facility, to handle all your capacity planning needs. You can use SAS to analyze performance data from several operating environments, creating an integrated system.

Now you can enjoy the power and flexibility of the SAS System—under OS, VM/CMS, DOS/VSE and SSX.

Call or write today. SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27511 USA. Telephone (919) 467-8000. Telex 802505.

The SAS System is available outside the USA from the Institute's subsidiaries in Heidelberg, West Germany; Weybridge, Surrey, UK; Wellington, New Zealand; and Sydney, Australia and from licensed distributors in Tokyo, Japan; Milano, Italy; Herzliya, Israel; and Singapore.

SAS saves time.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. SAS/GRAPH is a trademark of SAS Institute Inc. Copyright © 1983 by SAS Institute Inc.

FLOW_Calc™
THE VAX spreadsheet calculator
$3500
to try it yourself, call:
800-235-6788 (in California, call 805/964-7724 collect)
TWX/TELEX 910-334-1193
The Software Workshop™
GENERAL RESEARCH CORPORATION • A Flow General Company
5383 Hollister Avenue • Santa Barbara, California 93111

Features On-Line Maintenance

Ledger System Out in VAX Basic

SAN ANTONIO, Texas — Plycom Systems, Inc. has unveiled a general ledger system written in VAX Basic, designed to run on any Digital Equipment Corp. VAX-11 running the VMS operating system.

Features reportedly include menus, on-line maintenance of transactions and master files, accounting period orientation and automated period and year-end closing procedures. Reviewed annually by outside auditors, the system has an audit trail and conforms to all generally accepted accounting principles. Historical and budget reporting are both part of the standard system.

The general ledger system programs are available in source code along with documentation and complete technical and accounting support. Prices start at $7,500, from Plycom at Suite 150, 4243 Piedras E., San Antonio, Texas 78228.

'Template' Enhanced By Megatek

SAN DIEGO — Megatek Corp. has enhanced its Template interactive graphics software package with features designed to provide increased performance and improve productivity.

Template is a computer- and device-independent software package that provides the routines needed to create, display, modify and save graphics information for a variety of applications. Both two- and three-dimensional graphics can be accommodated in batch or interactive modes on most 32-bit or larger computers supporting Fortran, the vendor said.

Template Version 3.0's features reportedly include selective erase, polygon backface elimination and additional "save and restore" options. These features are said to extend Template's device intelligence — its ability to simulate a function not provided by the hardware of a display device.

Template Version 3.0 is a modular package available in several configurations ranging in price from $12,000 to $24,000, according to the vendor.

Existing installations will be field upgraded to include the new features of Version 3.0, Megatek said from 3985 Sorrento Valley Blvd., San Diego, Calif. 92121.

Package Fits HP MPE IV

ARLINGTON HEIGHTS, Ill. — Bakco Data, Inc. has introduced a purchasing application that runs under Hewlett-Packard Co.'s data base management system under HP's MPE IV operating system.

The package creates and modifies purchase orders, automatically updates inventory records, keeps track of open purchase orders, prepares receiving reports, monitors vendor performance and prepares cash commitment reports of open purchase orders, according to the vendor.

The package costs $9,800 from Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

What's it worth to you... if Zilog can prove that System 8000 is the most powerful Unix-based microcomputer you can buy?

There's only one way to prove that one computer system will outperform all others. Benchmark it. Test it. Then compare the results! That's the challenge we're giving to OEM's and systems houses serious about multi-user systems. Run your benchmarks on any other two UNIX-based micros and...

1. WE'LL PROVE...that the System 8000 has more raw computing power—so your CPU-bound programs run faster.
2. WE'LL PROVE...that the System 8000 achieves higher data throughput; that it can open bottlenecks in your I/O-bound applications.
3. WE'LL PROVE...that the System 8000 supports the UNIX operating system more efficiently; that our computers spend less time running the operating system and more time running your programs.
4. WE'LL PROVE...that the System 8000 family best withstands the demands of a multi-user environment; that its carefully designed architecture compares with that of minicomputers.

So, what's it worth to you if we can prove System 8000 is the most powerful UNIX-based micro you can buy? Money? Time? How about your success as an OEM?

The System 8000 family is priced from $14,950 to $37,950. Its industry-compatible languages open a wide range of minicomputer applications, making it the best buy for your money.

But don't take our word for it...

Take the System 8000 Challenge. Send for our challenge kit and test any other two UNIX-based micros. Bring your results into any Zilog sales office and compare them with the tests you run on the System 8000. If we don't win, then we'll give you something valuable for taking the challenge. Call Zilog toll free at 800-841-2255 for your challenge kit and start comparing today. Or write: Zilog, Inc., Corporate Publications, A1-5, 1315 Dell Avenue, Campbell, CA 95008.

*UNIX is a trademark of Bell Laboratories.

Zilog
Pioneering the Microworld
An affiliate of EXXON Corporation

Available From Third-Party Vendors

Packages for Eclipse Released

WESTBORO, Mass. — Data General Corp. has announced two applications packages for its Eclipse computers that are available from third-party vendors under the company's Independent Software Vendor program.

The Bridge Virtual Microcomputer System from Virtual Microsystems, Inc. is a hardware/software system that simulates a Digital Research, Inc. CP/M software environment on DG Dasher terminals. It costs from $1,800 to $8,250 based on configuration.

Pass/Accu-Pay is a human resource management system designed to automate recordkeeping in personnel and payroll functions. Pass organizes personnel records in a prescribed format, and Accu-Pay calculates pay and produces pay-related registers.

The system is priced between $19,000 and $75,000, depending on modules chosen. More information is available from DG at 4400 Computer Drive, Westboro, Mass. 01581.

Scan200 Provides Economic Data

ANN ARBOR, Mich. — ADP Network Services, Inc. has announced an on-line service that makes the top 200 economic indicators available in a special-purpose data base.

Scan200 includes preformatted graphs and reports that enable the user to retrieve and view data in less than three minutes, a spokesman said. Data is updated daily. Scan200 also contains the forecasts of Townsend-Greenspan & Co., Inc., a consulting firm.

The data base is said to be customized to offer the indicators most widely used by business executives. Four types of graphs and three reports are available automatically. The service can also be used for forecasting sales and finances, developing corporate chart books and projecting costs. It can also be used to graph the user's data or any ADP Network Services data.

Charges are based on usage from the firm at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

'Showdiff' Gives File Comparisons

BOULDER, Colo. — NOI Systems has announced an interactive file comparison program that runs on the Hewlett-Packard Co. HP 3000.

Showdiff is said to provide a line-by-line comparison of two Ascii files, displaying all differences found. The files may be line-numbered or unnumbered and may have record lengths of up to 216 characters, according to a spokeswoman for the firm.

The program is said to allow the user to control the comparison process by specifying the maximum number of differences and the minimum number of contiguous lines that must be identical in order for a match to occur.

Showdiff is priced at $395 for a single-CPU site and $495 for multiple CPU sites. More information is available from the vendor at Suite 505, 1877 Broadway, Boulder, Colo. 80302.

'Our Computer Won't Talk to Their Computer.'

File Processing Utility Targets HP 3000 Ksam

AUSTIN, Texas — Tymlabs Corp. has announced Copyrite, a file processing utility for the Hewlett-Packard Co. HP 3000 that is said to offer improvements in copying speed of HP Ksam files of up to 95%.

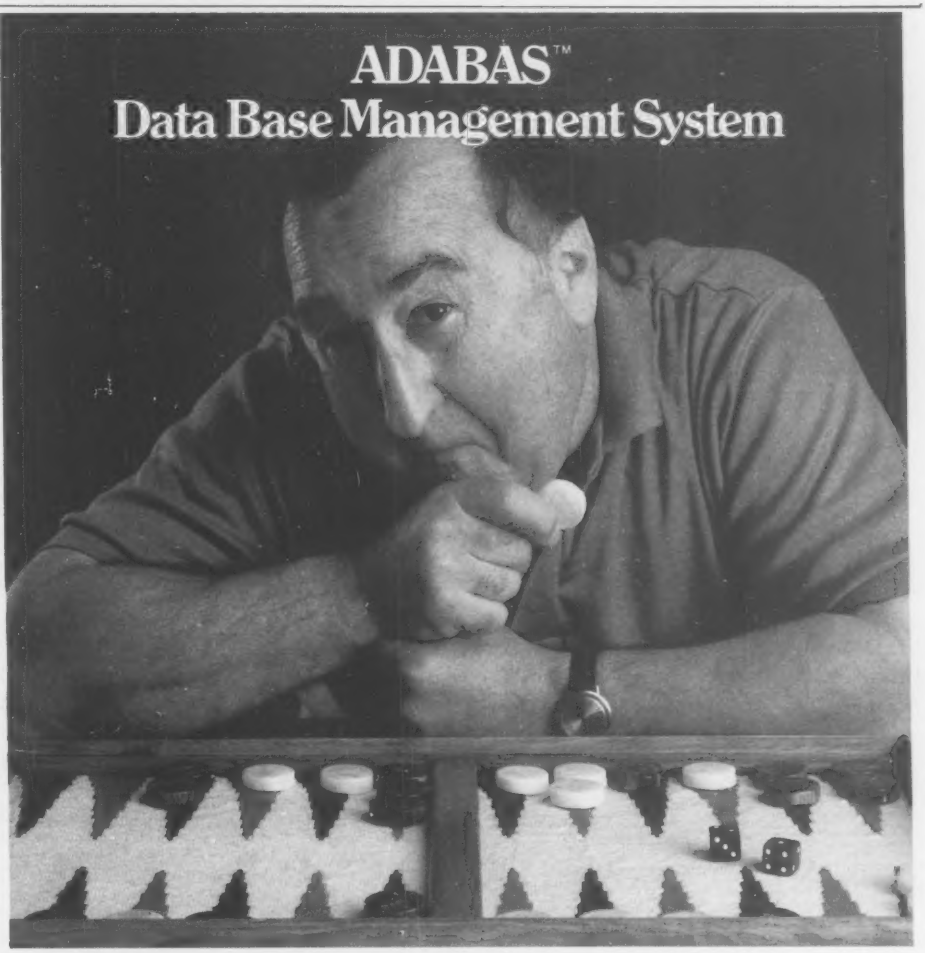
Copyrite reportedly separates the file building process into multiple sequential steps, resulting in faster file loads. Copyrite copies all data records to the Ksam data file through no-buffer, multirecord access I/O techniques. It then sorts all values for the first key using the system sort and performs a series of sequential writes to add the information to the key file, a spokesman said.

If more than one key is specified, Copyrite repeats the sort operation for each key.

If a user is operating in privileged mode, the utility extracts the key value for sorts while copying the data file records. It uses no-wait I/O and high-speed memory operations to move data between the extra data segments used as buffers and the stack.

Copyrite costs $2,000 with a 30-day demonstration tape priced at $100 from 211 E. 7th St., Austin, Texas 78701.

ADABAS™
Data Base Management System



It gives you time for the important decisions.

Life's too short to waste time dealing with your data base system instead of your applications. With ADABAS, you don't have to—because the system's flexibility works with you, not against you.

ADABAS offers all the facilities you need, plus an unsurpassed track record for ease of installation and use. ADABAS' relational-like architecture makes file design so simple, you can install the system and load your data files in a single day. And with NATURAL, our online productivity system, you can cut development time for new applications by 90%. Without a specialized programming staff.

It all adds up to a system that doesn't force you to play any games—except the ones you want to. A system that allows you to look ahead to your next move, rather than play catch-up all the time. A system that not only saves time and headaches for you, but for everyone in your organization.

ADABAS, from Software AG: once you've seen it, your most important decision will already be made.

software AG
OF NORTH AMERICA, INC

Software AG of North America, Inc.
11800 Sunrise Valley Drive
Reston, VA 22091
(703) 860-5050

☐ Please send me information on ADABAS.
☐ Please send me information on your free DBMS seminars.

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip Code _____ Telephone ( ) _____
CPU _____ Operating System _____

CW 0516

Inspec Releases Guide For Users of Its Data Base

PISCATAWAY, N.J. — Inspec, the information division of the Institute of Electrical and Electronics Engineers (IEEE), has announced the publication of a new users manual to replace the "Inspec Data Base Users Guide" and provide a reference guide for all aspects of searching the Inspec data base.

The manual includes the subject coverage of the data base, the policy governing the selection of documents and the data elements contained in a typical record.

Detailed descriptions of the ways in which the data base is loaded on the various on-line systems and guidance on the effects of these on searching are reportedly provided, together with search examples illustrating techniques for searches.

The manual costs $70 from Inspec, IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.

Series/1 'Subscript' Updated

RANCHO PALOS VERDES, Calif. — Academic Software Research Associates (Asra) has announced Release 1.2 of its IBM Series/1 Subscript text formatting system.

Subscript provides input, editing and formatting functions for letters, memos, documentation and reports. The new release adds password protection, electronic mailbox, extended editing and formatting functions and upward compatibility with the document preparation facility on an IBM mainframe

Subscript runs under Release 3.2 of the EDX operating system. It uses 24K bytes per session and requires no special terminal/printer configuration, a spokesman said.

The package costs $2,100 and is available through IBM or directly from Asra at 7010 Hartcrest Drive, Rancho Palos Verdes, Calif. 90274.

Reporting Tool Fits DEC VAX-11

NEW YORK — Enterprise Technology Corp. has announced the release of a generalized reporting system (GRS) for Digital Equipment Corp.'s VAX-11 superminicomputers.

GRS is a report writer, query and audit package designed for use with a variety of file formats and data base systems. It is compatible with applications packages from most major software vendors, as well as with systems developed by end users.

GRS is priced at a one-time fee of $6,500 under a perpetual license. More information is available from the vendor at 305 Madison Ave., New York, N.Y. 10165.

Prolink Unveils Ten Modules For Accounting

BOULDER, Colo. — Prolink Corp. has announced a series of comprehensive business management and accounting software modules that run on Prolink hardware.

The package, called Promas, consists of 10 modules written in Cobol, incorporating approximately 250 distinct programs. Modules can be installed separately and include general ledger, accounts payable, accounts receivable, payroll, order processing with invoicing, sales analysis, inventory control, bill of material with forecasting, purchase orders and job costing.

The system is said to be fully interactive, allowing on-line posting and inquiry and accommodating simultaneous use by multiple operators. Also, a controlled access feature ensures applications security, the vendor said.

Promas modules can be installed separately and have an average end-user price of $1,000, the vendor said. Prolink is located at 5757 Central Ave., Boulder, Colo. 80301.

Tymshare Offers Service for Banks

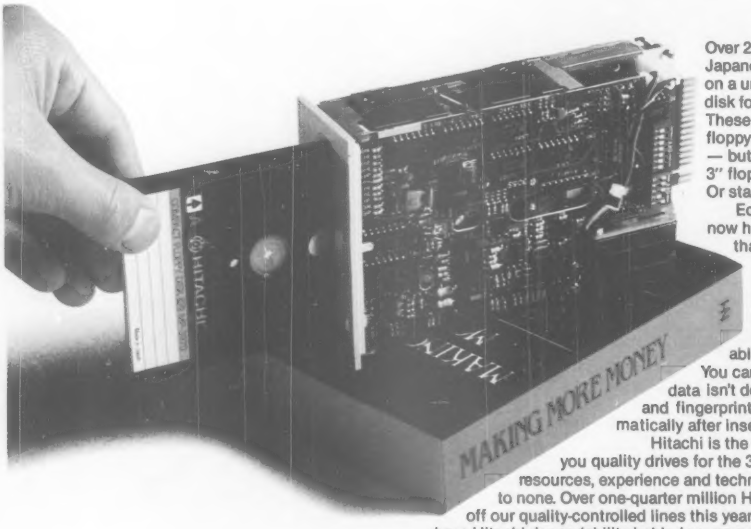
CUPERTINO, Calif. — Tymshare, Inc. has announced an application of its Ontyme electronic message network service to correspondent banking.

Called Financial Institution Communications System (Fics), the service allows data to be sent and accessed by word processors, small business computers or Tymshare's Scanset terminals. Fics provides an audit trail of all messages including dates and times they were sent and received. Messages need only be sent once, a spokesman said. Messages are stored automatically for two weeks at no extra cost.

Fics can be used in balance reporting, posting of prime rate changes, supplying information on loan participation opportunities, reporting of large dollar return items, execution of bond, security and other investment transactions, quotations of current investment rates and exchange of preformatted funds transfer instructions and acknowledgements between correspondent and respondent banks.

Prices vary according to use from Tymshare at 20705 Valley Green Drive, Cupertino, Calif. 95014.

Hitachi takes a big stride toward the smaller footprint.



Over 22 leading American and Japanese makers have agreed on a unified 3" compact floppy disk format for powerful reasons. These 3" floppies have 5 1/4" floppy capacity — 500 kilobytes — but are far more compact. A 3" floppy fits in the shirt pocket. Or standard mailing envelope.

Equally important, the drive now has a smaller footprint than ever before. It's quite light. And portable.

And new 3" compact floppy disks surpass any other format when it comes to protecting valuable data. The case is hard. You cannot bend the 3" floppy so data isn't destroyed. The dust-sealing and fingerprint-proof shutter opens automatically after insertion in the drive.

Hitachi is the first manufacturer to offer you quality drives for the 3" revolution. Hitachi has resources, experience and technological expertise second to none. Over one-quarter million Hitachi drives will be rolling off our quality-controlled lines this year. Wouldn't it be wise to have Hitachi dependability behind your products?

Specifications: Storage capacity unformatted: 500 K bytes. Total no. of tracks: 80. Recording density: 8,946 bpi. Track density: 100 tpi. Transfer rate: 250 K bits/sec. Track-to-track positioning time: 3 ms/track. Dimensions (W × D × H) mm: 90 × 40 × 150. Wt.: 0.68kg.
HFD305D: double sided drive. **HFD305S:** single side drive with same specs if a double sided floppy is inserted again for the second side.

CF Floppy disk marked CF can be used with this floppy disk drive.

3" Compact Floppy Disk Drive HFD305

HITACHI

For further information:
Mr. Takao Ichiki, Mid-Western Regional Office, Hitachi Sales Corporation of America, 1400 Morse Ave., Elk Grove Village, ILL. 60007 Phone: (312) 593-1550 Fax: (312) 593-2436
Mr. T. Kodera, New Jersey Office, Hitachi America, Ltd. 59 Route 17, Allendale, N.J. 07401 Phone: (201) 825-8000 Fax: (201) 825-4781

Micronotes

An in-store service for microcomputer users consisting of an on-line data base of information on more than 21,000 software packages has been developed by PC Telemart, Inc.

Essentially the service will enable retailers and their customers to conduct searches of the data base while in the stores to determine what software is available, obtain descriptive information and, in some cases, order the products electronically.

The vendor plans to launch a market test of the service with participating retailers in the Washington, D.C., area next month, to be followed by nationwide distribution of the service on a rental basis in the form of in-store booths complete with terminals and printers. Organizations which qualify as national accounts reportedly can access the Telemart service through a communications network such as Tymnet directly from PC Telemart headquarters in Fairfax, Va. In addition, software problems or questions will be handled through an electronic bulletin board, and the vendor plans to include reviews of the most popular software packages on-line.

The **PC Telemart Services** will be supported by the firm's PC National Software Library, which houses a collection of microcomputer software and hardware required to demonstrate and evaluate the software packages. The library will officially open this summer, the vendor said, and will be available to retailers, organizations and individual users on a subscription or fee basis.

PC Telemart, Inc. is headquartered at 11781 Lee Jackson Highway, Fairfax, Va. 22033.

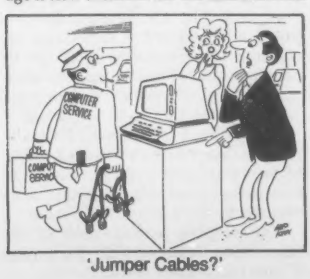
Peachtree Software, Inc. has announced **Peachtext 5000** for users of IBM's Personal Computer. The package incorporates word processing, financial planning and data base management functions and costs about $1,995, the vendor said from 3445 Peachtree Road, N.E., Atlanta, Ga. 30326.

Dunbar-Ridge Corp. has announced **Filedriver**, a set of file-handling utilities for users of Digital Research, Inc. CP/M Release 2.2 and MP/M II operating systems, as well as the Turbodos operating system offered by Musys Corp. Features include the ability to access 31 user areas, automate user-designed operations and file movement between user areas without copying. Filedriver costs $75, the vendor said from 102 Sterling Court, Syosset, N.Y. 11791.

K & S Associates has announced **Disassem**, an assembler program for the Radio Shack TRS-80 Model II. The package takes binary code and converts it to assembler source code. The package costs $49.99, the vendor said from 202 Park Ave., Bloomfield, Conn. 06002.

Alpha Software Corp. has announced **Data Base Manager II** for the IBM Personal Computer. Features include an integrated spreadsheet and word processing package with data base capabilities. The package costs $295, the vendor said from 12 New England Executive Park, Burlington, Mass. 01803.

Stoneware, Inc. has announced that its **DB Master** data base management package is now available for the IBM Personal Computer. Features include printing on various forms, an integrated text editor and report generator and an array search facility. The package costs $499, the vendor said from 50 Belvedere St., San Rafael, Calif. 94901.



'Jumper Cables?'

Sperry Corp. has announced its **UTS 40** intelligent terminals can now use Digital Research, Inc.'s CP/M Plus operating system. The CP/M Plus option is available for a $300 extended term charge from the firm through P.O. Box 500, Blue Bell, Pa. 19424.

N.F. Systems, Ltd. has announced **Release 1.0** of its **Hostcomm** communications program for IBM Personal Computers. The new package includes the ability to operate at either 300 or 1,200 bit/sec. The package costs $170 from the vendor through P.O. Box 76363, Atlanta, Ga. 30358.

Interactive Technology, Inc. has announced it has reached an agreement with Hamilton Micro Systems, Inc. to offer **Hamilton's RDM 300 applications development package** to users of Digital Equipment Corp.'s Professional 350 microcomputers. The package reportedly allows end users to develop programs and offers word processing and spreadsheet analysis functions. It costs $995, the vendor said from Suite 103, 1225 N.W. Murray Road, Portland, Ore. 97229.

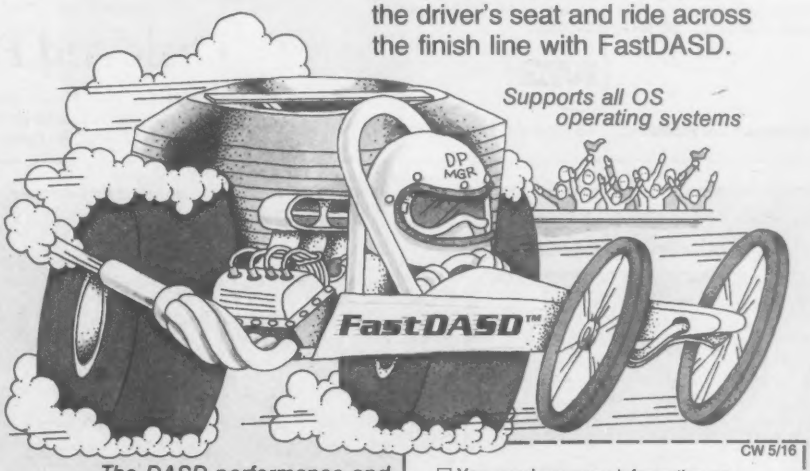
Prairie Data Systems, Inc. has added the **Multiplan Spreadsheet Link** to its Financial Reporting System. The packages can run on a variety of microcomputers including the IBM Personal Computer, Xerox Corp. 820, Radio Shack TRS-80 Model II and Digital Equipment Corp. Rainbow. The spreadsheet link allows users to send financial statements directly from the Financial Reporting System to the spreadsheet package for further analysis. The combined Financial Reporting System with the Multiplan Spreadsheet Link costs $1,040. For current users of the Financial Reporting System, the Multiplan Spreadsheet Link alone costs $200, the vendor said from 202-626 Broadway Ave., Saskatoon, Sask., Canada S7N 1A9.

Bytel Corp. has announced its **Cogen program generator** and **Menupro menu processing package** can be used on microcomputers manufactured by Pixel, Inc. under the Bell Laboratories Unix operating system. Cogen is a program generator for business applications. The package costs $950 and reportedly cuts program development time. The Menupro package provides a structured method for microcomputer menu design. It costs $250, the vendor said from 1714 Solano Ave., Berkeley, Calif. 94707.

FastDASD™ improves performance of your DBMS.

- Migrating to new devices?
- Moving to a new machine?
- Having performance problems with your DBMS?
- Reorganizing data sets?

If the answer to any of the above questions is yes, find out today why hundreds of other companies are buying FastDASD . . . the DASD performance and reporting system.
Take charge of your DASD performance problems—get in the driver's seat and ride across the finish line with FastDASD.



Supports all OS operating systems

The DASD performance and reporting system

CALL 703-471-1545 for an Information Pack on how to "TEST DRIVE" FastDASD for 30 days, or fill out the coupon at right. See for yourself why FastDASD is your DASD's best friend!

SOFTWARE CORPORATION OF AMERICA
455 Carlisle Drive • Herndon, VA 22070

CW 5/16

☐ Yes, send me more information on improving performance with FastDASD.
Software Corporation of America
455 Carlisle Drive • Herndon, VA 22070
703-471-1545

Name _____
Title _____
Phone _____
Company _____
Address _____
City _____ State _____ Zip _____
OP SYS ____ CPU ____ #DASD spindles ____

Remote Computing Costs Compared in Study

(Continued from Page 91)

vices in the RDC report, and its TSO service ranked fourth among the seven TSO services. The researchers reported that the costs of these services is within 2% of the mean for similar operating environments represented in the report. In addition, the run costs for IBM's Information Network are said to be impacted currently by the requirement to record each individual run separately. It was anticipated that a modification of this policy to a more standard industry costing procedure would further improve their comparative position.

Of the 23 runs made to compare hardware groupings, the CDC and Decsystem-20 groups averaged the lowest cost on 11 each, with the other first place taken by the Honeywell, Inc. grouping.

While CDC and Decsystem-20 services proved to be the least expensive for CPU costs, storage costs were shown to be clearly lower on services utilizing IBM hardware. Those services that ranked in the lowest quarter for storage costs were all standard IBM VM/CMS or MVS/TSO offerings. Fifteen of the 16 CMS and TSO services were in the lowest half of the services compared.

On the basis of individual services, Sun Information Services Co.'s Cyber offering generated the most first places this year, followed by the Decsystem-20 offering from Landart Systems, Inc. of New York.

In addition to the detailed cost analysis, the RDC report provided an informational overview of each vendor's facilities, support services and standards of performance.

A new feature this year is a section that reports on the software and services offered for microcomputers. Over 63% of the services have addressed the "micro revolution," the researchers noted, listing the methods they have used as follows:

- A proprietary hardware/software approach that is practiced by relatively few of the time-sharing services due to the expense factor.
- A specific product/services approach with interfaces provided to selected software products only.
- A decision support software approach that includes support for specialized micro products as well as micro-mainframe interfaces for distributed processing.
- A "lowest common denominator" approach, which is support for the standard array of micro software plus off-line data collection capabilities.

The cost of the RDC report is $995 plus postage and handling. RDC is located at 123 High Ridge Road, Stamford, Conn. 06905.

VENDOR	REPORT REFERENCE	HARDWARE
General Electric Information Services Company		
• MARK III Foreground	GEISCO/Foreground	Honeywell
• MARK 3000	GEISCO/MARK 3000	IBM
Honeywell Information Systems, Inc.	HIS	Honeywell
Informatics General Corporation	Informatics	IBM
International Business Machines Information Network		
• VMPS Service	IBM IN/VMPS	IBM
• MVSPS Service	IBM IN/MVSPS	IBM
Landart Systems, Inc.	Landart	DEC-20
McDonnell Douglas Automation Co.		
• DAC-II Service	McAuto/DAC-II	CDC
• TSO Service	McAuto/TSO	IBM
National CSS	NCSS	IBM
Rapidata	Rapidata	DEC-10
Ross Systems, Inc.	Ross	DEC-VAX
Sun Information Services		
• CMS Service	SIS/CMS	IBM
• Cyber Service	SIS/Cyber	CDC
• TSO Service	SIS/TSO	IBM
Timesharing Consultants, Inc.	TCI	DEC-20
Time Sharing Resources	TSR	IBM
Tymshare, Inc.		
• Tymcom-X	Tymshare/Tym-X	DEC-10
• Tymcom-370	Tymshare/Tym-370	IBM
United Information Services Inc.		
• Apex	UIS/APEX	CDC
• AS-6/370	UIS/AS-6	IBM
• DEC-10	UIS/DEC-10	DEC-10

Additional Vendors in RDC Study

Announcing

A Breakthrough for IBM O/S Systems Documentation/Maintenance

The M&G Automated Documentation System produces structural and data flow documentation for large scale systems and programs in data element detail.

Now you can save hundreds of programmer hours. Get maintenance projects finished quickly and easily. Get complete, up-to-date documentation with the Automated Documentation System from **M&G**.

Check these advantages:

- **Reduced programmer hours**
- **Improved programmer morale**
- **Better quality programs**
- **Improved standards compliance**

The new **M&G** system produces program and system documentation by automatically analyzing machine-readable COBOL source program statements and reporting the relationships between programs, subroutines, COPY books, files, records, and data elements. For complete details and price information call today tel. **(617) 647-1052.**

M&G

M&G Software Services Inc. 18 McAuliffe Road, Randolph, MA 02368

Disk Aid Fits RSX-11M-Plus

BERKELEY, Calif. — Proto Systems has made its D-M-Driver disk emulation software available on Digital Equipment Corp.'s RSX-11M-Plus operating system.

The company also announced CP/SIM, a set of programs and utilities that allows a DEC VAX/VMS-based system to execute programs designed for Digital Research, Inc.'s CP/M operating system.

D-M-Driver offers use of a portion of memory as a disk substitute without adding additional hardware, the company said. It can be configured as a single-disk unit with the number of disk blocks limited by the available physical memory allocated. A practical range of equivalent disk sizes is from 64K bytes to 3.75M bytes. The complete package costs $550.

CP/SIM's simulated CP/M environment is that of an Intel Corp. 8080 microprocessor with 64K bytes of memory. The file system is that normally used by VAX/VMS, a spokesman said. The CP/M environment provides access to the VAX disks, increasing storage available for CP/M programs and allowing features such as version numbers, date time stamps and file protection to be employed.

The package includes a CPX utility for transfer of files between a CP/M formatted disk and the host VAX. It can also reportedly be used to convert file formats on the VAX itself.

The complete package costs $2,400 from Proto Systems, 1238 Josephine St., Berkeley, Calif. 94703.

GRAPHICS-PLUS
an enhancement
For Z19 Terminals
from
Northwest Digital Systems

- Tektronix[2] 4010 Compatible Graphics
- 512 Horiz by 250 Vert Resolution
- 80/132 Col and 24/49 Line Text Displays
- Seven Page Off-Screen Text Memory
- Menu-driven "Plain English" Set-up Mode
- 16 Programmable Keys- 128 Chars Each
- Optional Hardcopy Port
- Simple Field Installation

GRAPHICS-PLUS is a field installable enhancement board for the popular Zenith[1] Z19 video terminal adding many powerful features found only on terminals costing much more. GRAPHICS-PLUS provides Tektronix[2] 4010 compatible vector drawing graphics, VT100[3] compatible 80 and 132 column display formats, off-screen scrolling memory, programmable function keys, "Plain English" menu-driven Set-up mode, and a host of other enhancements. Installation can be accomplished within 15 minutes using only a screwdriver.

1 TM Zenith
2 TM Tektronix
3 TM DEC

GP-19 Upgrade for Z19 Terminal	$ 849
Z19 Terminal With GP-19 Installed	$ 1495

Northwest Digital Systems
P.O. Box 15288, Seattle, WA 98115 (206) 362-6937

Wang. Finally a computer company that takes service personally.

It's no secret that, historically, most computer companies have taken sales more seriously than service.

But Wang is changing all that with WangCare.

WangCare, our total service philosophy, is your assurance that the office automation system you buy today will be maintained at maximum running efficiency. Automatically.

WangCare includes uptime guarantees, extended service coverage, software support, our Technical Assistance Center, and Call Control Centers that are ready to respond to your request for service where and when you need it.

What's more, Wang provides a range of personal comprehensive customer support programs including hands-on training, documentation, multi-site installation guidance, and advanced applications assistance.

Wang Customer Engineering, our worldwide network of service specialists, has made service a full-time business.

And that's our commitment. The service we deliver has to be just as good as our system. After all, would you expect anything less from the world leader in office automation?

For more information, call 1-800-225-9264, or write to Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer Company

A826

© 1983 Wang Laboratories, Inc.

The
FIFT
GE

H GENERATION

IN DEPTH

An American Response

Excerpted from THE FIFTH GENERATION, by Edward Feigenbaum and Pamela McCorduck, copyright © 1983, by permission of Addison-Wesley Publishing Co., Inc., Reading, Mass. All rights reserved.

In an otherwise unremarkable office building in Tokyo, a group of highly dedicated young researchers is engaged in designing a new computer generation that will transform the way the Japanese work, whether they are fishermen or powerful business executives, farmers or shopkeepers, scientists or schoolchildren. The vehicles of revolution are to be known as knowledge information processing systems, or Kips.

This new generation of computers will be more powerful than any other the world has seen — indeed, by orders of magnitude. But their real power will lie not in their processing speed but in their capacity to reason. They will reason, moreover, with enormous amounts of information that will be constantly selected, interpreted, updated and adapted as circumstances change those facts. Kips are intended to bring knowledge — large amounts of it, tailored to any given user's needs — to any task a user might wish to do.

The Japanese expect these new computers, which users will be able to speak with in everyday conversational language, or show pictures to, or transmit messages to by keyboard or handwriting, to penetrate every level of society. They will assume no special expertise or knowledge of arcane programming languages. They will not even require the user to be very specific about his needs, because they will have reasoning power and will be able to tease out from the user, by questioning and by suggestions, just exactly what it is the user wants to do or know. Finally, these new machines will be inexpensive and reliable enough to be used everywhere: in offices, factories, shops and, of course, homes.

The Japanese expect these computers to be the kind most generally in use worldwide by the 1990s. They expect such powerful reasoning and knowledge processing to transform their society — and save it, too. Because they see no economic alternative in the long run, the Japanese will not only broker knowledge itself to the world, but they will also sell products and services whose design is so knowledge-intensive that their superiority must claim a large proportion of world markets.

By the beginning of the next decade, the Japanese plan to be well on their way to utilizing the amassed knowledge of human civilization as their leverage to achieve a preeminent role in world trade. Other developed nations, in particular Great Britain and France, recognized the wisdom of the Japanese plan and are undertaking strategies of their own. Each such plan,

(Continued on In Depth/6)

IN DEPTH

A Proposal for Action by the U.S.

As Americans, we are not without alternatives, however unpalatable the reality of some of them may be. *Our* own first choice would be a center for knowledge technology.

The U.S. is not Japan. The U.S. Commerce Department is not the Ministry of International Trade and Industry, and the Pentagon should not be, even by default. Nearly everyone in the information processing industry agrees that some sort of cooperative effort is necessary to ensure well-educated researchers, fruitful research and an end to the frittering away of resources in short-term get-rich schemes that benefit the very few. We do *not* have unlimited resources of any kind, and other nations are moving off into a future where we must follow whether we like it or not, but where we could lead if we wanted.

Though there have been several different attempts by industrial groups to pool certain resources, good intentions have been frustrated by a deeply ingrained tradition of commercial competition (legally reinforced by means of strict antitrust laws), by the lack of any suitable framework in which to carry out cooperation and by the lack of widely shared national goals.

One eminent scientist has quite seriously suggested that all who are concerned about the Japanese fifth generation should put all their energy into persuading our own great national resource, IBM, to take on the task of competing with the Japanese project — that IBM is our best hope. Though the idea has its beguiling aspects (not to mention its bizarre ones), it seems a bit fanciful. Moreover, it would give to one firm an exclusive command over a technology that many firms ought to share, as the Japanese have recognized.

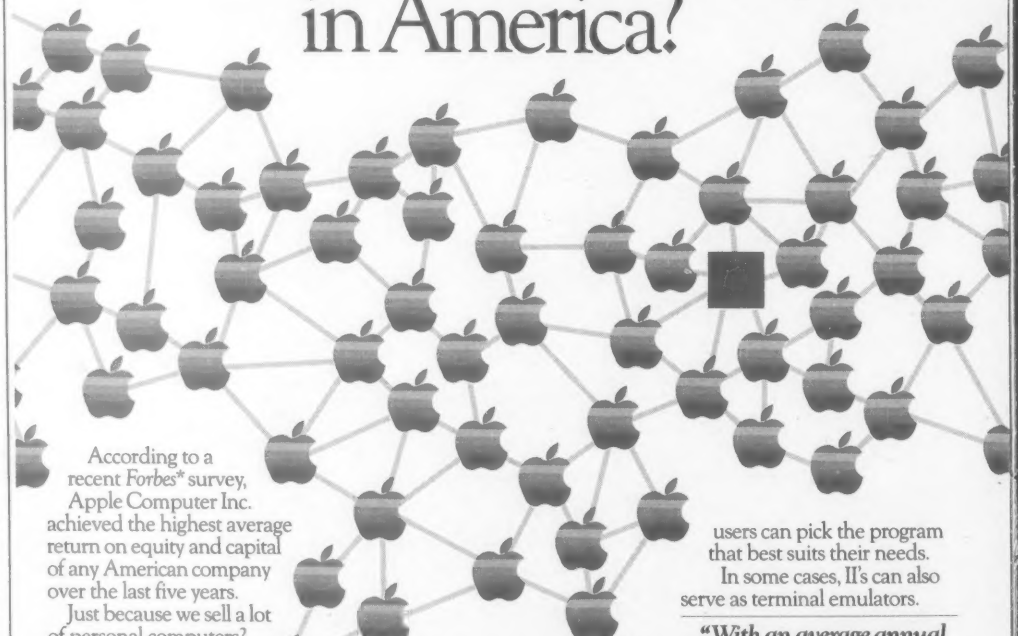
Let us make another proposal. The U.S. should form a national center for knowledge technology. By "knowledge technology" we mean computing, certainly, but we also mean other related forms of knowledge distribution, such as libraries, for which there are important technological needs and exciting opportunities. This idea of a national center of knowledge technology isn't original with us; industrialists, educators and government officials have all suggested variations on the idea.

An alternate form of the plan would be a national center for information processing technology, conceived recently by a senior government science administrator. It would cut more deeply into the world of technology but less broadly across the world of knowledge systems. This center would not compete with industry. On the contrary, it would play a role similar to that of the Advanced Research Projects Agency (Arpa), supporting the kind of basic research no single firm or even group of firms can afford to risk. Like Arpa, it would fund and coordinate high-risk projects through their early research stages until industries could take the results into the development stage. Its responsibilities would be long-term results, not short-term profits. Thus its funds might come from all who would stand to gain from such a center in both the public and the private sectors. Funding has to be generous, the amount to depend on how widely or narrowly knowledge technology is construed.

If it is narrowly construed, a pilot project something like the Japanese fifth generation might be undertaken — we certainly believe the U.S. owes it to itself to continue the research it pioneered, to develop it and to reap its obvious benefits. But if the center is broadly construed, it would embrace research in an enormous complex of information and knowledge technologies, from telecommunications to publishing, from new

First in a series of reports on the role of personal computers in the office.

What's the secret behind the most profitable company in America?



According to a recent *Forbes** survey, Apple Computer Inc. achieved the highest average return on equity and capital of any American company over the last five years.

Just because we sell a lot of personal computers? That doesn't hurt.

But we also *use* a lot of personal computers.

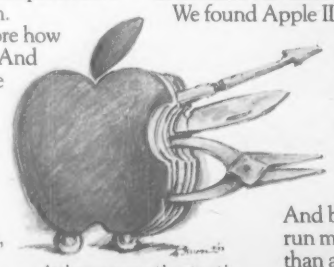
Over 3500 Apples.* All part of a cost-efficient and productive information system.

Here, we'll explore how this system works. And how companies like yours can make the transition to personal computers smoothly and successfully. No theories or fantasies. Just facts, from our own fruitful experience.

To each his own Apple.

At Apple, we put Apples on every desk. The nature of the work determines the nature of the Apple. We found Apple II's (and now Apple IIe's) to be the most affordable solution for most of our dedicated, ready-to-run applications. And because they run more software than any other personal computer, users can pick the program that best suits their needs.

In some cases, II's can also serve as terminal emulators.



Apple comes to you with nationwide on-site service and support.

"With an average annual return on equity of nearly 119%, Apple is indisputably number one..." — *Forbes*

Apple III's, with even more memory and processing capability, offer us important standalone virtues. Including an impressive choice of powerful management tools — from word processing to presentation graphics.

The III can also serve as a sophisticated terminal emulator. (Apple's new Protocol Converter can handle most 3270 series terminals, so any Apple can communicate with mainframes — in our case, an IBM 4341-2.)

—A National Center for Knowledge Technology—

computer designs to new curriculum designs for our schools. Eventually it must assign priorities to national research and take the difficult step of setting standards flexible enough for new technology to be accommodated, yet stern enough to avoid the wasteful incompatibilities we have seen, for example, in videodisks and computer software.

Though funds must come first from the government, this agency should not come under the government. The civil service salary structure cannot cope with the need, and the civil service machinery is too ponderous to allow the center to work with the speed and suppleness it must have. Indeed, it should probably be staffed by people on loan from firms, research laboratories, universities and other talent pools.

The difficulties are obvious. How are intellectual property rights to be properly assigned and rewarded? Common law has a long tradition of dealing with real property, but its dealings with intellectual property have been uninspired. We have already talked about the dearth of qualified scientists and engineers in AI and the rest of computer science, and such a center would drain talent from universities and other research laboratories. But this is a problem, like the problems of intellectual property rights, that our society will have to face anyway. The establishment of a center might in fact help in the solution. How is technology to be transferred effectively from the laboratory to industry? How is a high level of innovation to be maintained? There are other serious problems, but what choice do we have?

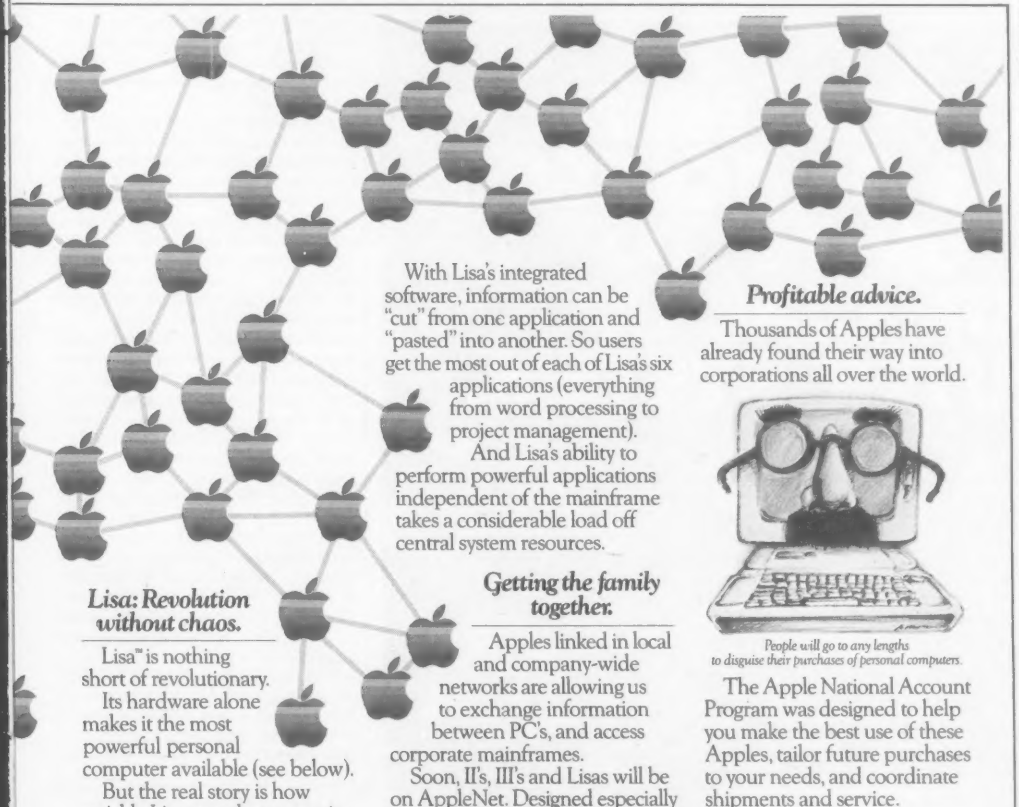
The center we propose would be an expression and institutional embodiment of national will, much as the Kennedy and Manned Spacecraft Centers of Nasa have been. There has never been an organization like it in the U.S. Projects of this magnitude have been government- or military-controlled, as, for example, the space program was. But then there has never in our history, or in the history of the world, come such a sudden and profoundly exciting opportunity.

We have the opportunity at this moment to do a new version of Diderot's *Encyclopedia*, a gathering up of all knowledge — not just the academic kind, but the informal, experiential, heuristic kind — to be fused, amplified and distributed, all at orders of magnitude difference in cost, speed, volume and *usefulness* over what we have now.

What faces us, if you like, is the Louisiana Purchase in the manifest destiny of computing.

Should our knowledge technology goals continue to be set only by the military, certain compromises must occur. First, such research might become strategic, subject to government regulation, which would mean an end to the rapid and free exchange of ideas that has so enriched the early work in AI, knowledge systems and computing in general. Second, research might eventually be skewed primarily toward military objectives. Military and civilian goals can be harmonious, but they are different.

If, of course, Americans can only bear the burden of financial support in the name of national defense, we can call it national defense. We built the interstate highway system in the name of national defense, and with the same justification we educated a generation of college students in everything from Asian art to zoology. In a national center for knowledge technology, we are suggesting no more than insurance in a world where other nations have already perceived the centrality of knowledge to their self-interest and are acting upon it.



Lisa: Revolution without chaos.

Lisa™ is nothing short of revolutionary.

Its hardware alone makes it the most powerful personal computer available (see below).

But the real story is how quickly Lisa puts that power in your hands.

Because Lisa replaces complex computer commands with familiar symbols and a "mouse" pointer, learning time is reduced from over 20 hours to under 30 minutes.

With Lisa's integrated software, information can be "cut" from one application and "pasted" into another. So users get the most out of each of Lisa's six applications (everything from word processing to project management).

And Lisa's ability to perform powerful applications independent of the mainframe takes a considerable load off central system resources.

Getting the family together.

Apples linked in local and company-wide networks are allowing us to exchange information between PC's, and access corporate mainframes.

Soon, II's, III's and Lisas will be on AppleNet. Designed especially for Apples, this cost-efficient local area network will also interface to other LAN's.

For long-haul communications, any Apple can communicate with any other personal computer or mainframe over standard phone lines.

For example: Our distribution centers can enter customer orders and sales data into our DEC or IBM computers, transfer it over public networks, consolidate it on our headquarters' mainframe, and make it available to any of Apple's Apples (with proper security clearance) first thing every morning.

Profitable advice.

Thousands of Apples have already found their way into corporations all over the world.

People will go to any lengths to disguise their purchases of personal computers.

The Apple National Account Program was designed to help you make the best use of these Apples, tailor future purchases to your needs, and coordinate shipments and service.

We offer a variety of support services, including nationwide on-site service (in conjunction with RCA Service Company). And a toll-free support line.

Plus on-site training and a host of self-teaching tutorials.

So, no matter how large your company, Apple has all the elements necessary to improve your information systems management.

And to help you profit from our experience.

apple

The most personal computer.

APPLE IIe

Expandable 64KB standard memory. Versatile standalone management tool for operations or planning. Thousands of ready-to-run applications.

APPLE III

256 KB standard memory. Advanced standalone capability, with terminal emulation and sophisticated programming. Runs more business applications than any other PC.

LISA

1MB memory, 32/16 bit MC68000 Microprocessor. Revolutionary user interface with integrated application software enhances installation, operation and networking.

*Forbes 35th *Annual Report on American Industry*, Jan. 3, 1983. Note: The same survey also found Apple to be number one in sales and profit growth. For information regarding corporate purchases through our National Account Program call **(800) 538-9696.** Or write Apple Computer Inc., MIS/EDP Marketing Dept., 20525 Mariani Ave., Cupertino, CA 95014. ©1983 Apple Computer Inc.

IN DEPTH

(Continued from In Depth/3)

including Japan's, revolves around development of a new technology that embodies knowledge as its central feature — knowledge that will transform its holder's small advantage into a powerful, eventually decisive advantage in any competition.

The U.S., which pioneered the technology each of these national plans is based upon, and which has been preeminent in information technology for decades, has no such plan. A few industrialists and government officials are alert to these programs abroad and understand the consequences if the U.S. makes no rational plan of its own. But on the whole, Americans are remarkably indifferent to, even ignorant of, the challenges to the U.S. predominance in everything from computing to finance, industrial output to quality of life, that these other plans represent. We are, as usual, relying on matters to take care of themselves. Because information technology moves so much faster than other kinds of technology — halving in price and doubling in power every two years on the average — matters aren't likely just to take care of themselves in ways that Americans will be altogether happy with.

Expert Systems And Knowledge Engineering

To answer in some detail the question of just what the Japanese plan to do, it is important to understand something at the heart of the fifth generation, the applied side of artificial intelligence (AI) called knowledge-based systems. What knowledge-based systems are, how they came about and how they are still under development are the themes to be explored.

In some sense, all artificial intelligence is applied, because unless experimental results confirm theory, unless a program exhibits the intelligent behavior it is meant to exhibit, the theory has less credibility. But knowledge-based systems have a particularly strong flavor of the applied because they are characterized by large amounts of specific knowledge. A speech-understanding system, for example, not only will know what the subject matter under discussion is (and various facts about it) but will also have semantic, syntactic, lexical, phonemic, phonetic and pragmatic knowledge about the language the speech is being spoken in, will know things about the vocal habits of the specific speaker it is listening to and so on.

We have already remarked that a shift took place in AI research over the past two decades. It was a shift from a search for broad, general laws of thinking toward an appreciation of specific knowledge — facts, experiential knowledge and how to use knowledge — as the central issue in intelligent behavior. This shift came not as a consequence of irrefutable arguments that immediately persuaded all researchers by their cogency and correctness. Rather, the shift came about because demonstration projects that used large amounts of specific knowledge simply worked.

The project that began AI's shift to the knowledge-based viewpoint was Dendral, an expert system that was able to infer chemical structure from data available to physical chemists.

ADD TWO NEW LEVELS OF ACCESS SECURITY TO YOUR DIAL-UP COMPUTER SYSTEM.

Unauthorized computer access. A nightmare for large companies. And a potential disaster for small ones. But not anymore. Because "The Defender" adds two new levels of access security to dial-up data lines.

This state-of-the-art access control system provides the latest advancements in computer security. In addition to normal password techniques, The Defender demands a second access procedure. In a digitized voice, it asks the user for a personal ID code – which must be entered via touch-tone telephone.

Then, it provides what is probably the most significant advance in computer access security. The Defender searches its database for that ID code, then automatically calls the user back at the one telephone number authorized for that code. Even if an unauthorized user does manage to break the log-on procedures, he must also be physically located at the telephone number which corresponds with the user's ID code – a highly unlikely occurrence.

The Defender installs on any host computer, with no software or hardware modifications. It uses Racal-Vadic's advanced "Multiline Automatic Calling System," which can accommodate up to 59 simultaneous users – at speeds up to 9600 bps.

So if you've got a computer that's a little too friendly with strangers, look to The Defender. For more information, write for our brochure at: Digital Pathways, 1060 East Meadow Circle, Palo Alto, CA 94303. Or call us at (415) 493-5544. TWX: 910-379-5034

DIGITAL PATHWAYS

THE DEFENDER.
SO YOUR COMPUTER WON'T TALK TO STRANGERS.

United States Headquarters: (415) 493-5544 • Eastern Regional Office: (301) 997-6886 • Canada: (403) 288-2744
England: (03) 813 813 • Germany: (089) 60 60 71-72 Telex: 5216290 isio d • Switzerland: 022/310587 Telex 289191

VOLUME DATA ENTRY SERVICES

AKD

Call Our TOLL-FREE HOTLINE
For Instant Quotes
800-228-9410
FOR OVER 14 YEARS

AMERICAN KEY DATA

5314 S. 99th ST. • OMAHA, NE 68127

The effort began in 1965, shortly after Feigenbaum's move to Stanford University. There he met a kindred scientific soul, Joshua Lederberg, a professor of genetics and Nobel laureate, who had long been fascinated by the possible uses of computers to model and to assist scientific thinking. Together they began to write the reasoning programs that could infer molecular hypotheses from chemical data.

They saw immediately that the programs could not perform in an effective, practical, expert manner without considerable knowledge of physical chemistry. So Lederberg recruited the talents and expertise of Carl Djerassi — well known as a physical chemist, but even better known as "father of the birth control pill" — from the Stanford chemistry department. The interdisciplinary team from computer science, genetics and chemistry labored for years to produce an expert system so knowledgeable and effective that its ability to explicate the details of molecular structure from chemical data now exceeds human capability, including that of its designers. Dendral has been in use for many years at university and industrial chemical labs around the world.

Early Responses

Despite its obvious power and utility, Dendral did not meet with immediate universal acclaim. McCorduck remembers hearing Feigenbaum lecture in the early 1970s at Carnegie-Mellon, where he was talking about Dendral and, more important, talking about the usefulness of the knowledge-based approach to artificial intelligence.

Feigenbaum's lecture was an interesting occasion for many reasons. He had done his graduate work at Carnegie and his thesis advisor and spiritual father, Herbert Simon, whom he deeply admired, was in the audience. Beside Simon was Allen Newell, another artificial intelligence great, and scattered about the room were some of the best and brightest in computer science in general and artificial intelligence in particular.

But the Carnegie mood was skeptical, if not atheistic, when it came to the idea of knowledge-based expert systems. If artificial intelligence were to become a science, it ought to have discoverable grand and universal laws, like physics and chemistry.

Feigenbaum talked about Dendral and then threw out a challenge. "You people are working on toy problems," he said. "Chess and logic are toy problems. If you solve them, you'll have solved a toy problem. And that's all you'll have done. Get out into the real world and solve real-world problems."

Now, AI workers had not chosen simplified — or "toy" — problems just to be perverse. It is sound science strategy to choose a simplified problem and explore it in depth to grasp principles and mechanisms that are otherwise obscured by details that don't really matter. But Feigenbaum was arguing to the contrary, that here *the details not only mattered; they made all the difference.*

There were murmurings among the graduate students. Maybe Feigenbaum was right. Maybe if you built a smart chess machine, all you had in the end was . . . well, a smart chess machine. And not immediately, but later, Carnegie-Mellon came around, and a group of Carnegie researchers built remarkable knowledge-based systems, Hearsay and Harpy, to understand continuous human speech. The vocabulary was limited and the systems moved less than gracefully between one speaker and another, but in their limited way they worked. Much more important, they provided some useful ideas about how knowledge might be arranged and used and improved upon. There would be more such systems to come from Carnegie-Mellon scientists.

The modeling of mind by mechanism — artificial intelligence and its sibling, cognitive science — has traveled many paths and a great distance in its first quarter-century. The paths have converged on the central thesis that understanding, problem solving, all the other functions of intelligence, even learning, are all crucially dependent upon knowledge. One must know first in order to be able

Software reliability, who cares?

Who cares?! You care! Because reliable software solutions mean greater confidence and fewer headaches.

At MCBA, we care enough to see that our applications are continually enhanced to meet user needs. We quality-assure our products with rigorous testing. And we stand behind them with responsive service and support.

Here's what satisfied users and resellers of MCBA applications have to say:

"From the viewpoint of reliability, MCBA packages get a very high rating. I think the main reason is that MCBA is constantly going through their programs and correcting them and improving them as needed. That kind of support is often not available with other software."
Charles E. Thomas, President
Computer Techniques and Information,
Phoenix, Arizona

"I'm very impressed with the MCBA system that we have. It works every single time. I've recommended it to many people."
Susan Power, Manager of Data Processing
SMC Pneumatics, Inc., Indianapolis, Indiana

"We have found that the MCBA packages meet our requirements better and are more bug-free than other comparable packages. We've been installing them for quite a broad range of users, and they are all very satisfied."
Dennis Henderson, President
S-Cubed Business Systems, La Jolla, California

11,000 users worldwide know they can rely upon MCBA software to save them time and money in their businesses. You can, too. Because at MCBA, we care about reliability.

Reseller inquiries invited.

Mini-Computer Business Applications, Inc.
2441 Honolulu Avenue, Montrose, California 91020
Telephone: (213) 957-2900 Telex: 194188

MCBA®

☐ I care.

Please send me free information for the MCBA applications I've checked below:

Digital Equipment (PDP®-11 and VAX®—DIBOL)
☐ Accounting and Payroll ☐ Distribution
☐ Manufacturing ☐ Professional

Texas Instruments (DS990 and Business Systems—COBOL):
☐ Accounting and Payroll ☐ Distribution

Wang Laboratories (WANG VS—COBOL):
☐ Accounting and Payroll ☐ Distribution

Hewlett-Packard (HP 3000—COBOL II with IMAGE):
☐ Accounting and Payroll

Name _____
Title _____
Company _____
Address _____
City _____ State _____
Zip _____ Country _____
Phone (_____) _____ ☐ Call me immediately.
I am a ☐ Reseller; ☐ End User; ☐ Consultant;
Other _____ CW 051683

Visit us at DEXPO™ East 83 Kiel Auditorium St. Louis, Missouri May 22-24, 1983 Booth #102-103

IN DEPTH

to understand later. One must even know first to be able to know more later.

Domains of the Experts

Knowledge-based systems, to labor the obvious, contain large amounts of varied knowledge which they bring to bear on a given task. Expert systems are a species of knowledge-based system, though the two terms are often used interchangeably.

To demonstrate the usefulness of expert systems, we will survey the range of fields where they have been applied already.

Perhaps the largest single group of expert systems is centered in medicine. The most knowledge-intensive expert system in existence is the Internist/Caduceus system at the University of Pittsburgh, the creation of a physician, Jack Meyers, and a computer scientist, Harry Pople. Internist/Caduceus (known informally as "Jack in the Box") does diagnoses in internal medicine at a level of expertise that allows it to solve most of the CPCs, or clinical pathological conferences, that appear in the *New England Journal of Medicine* and constitute a kind of test-your-wits quiz for doctors.

By now, Internist/Caduceus covers more than 80% of all internal medicine; its knowledge base encompasses about 500 diseases and more than 3,500 manifestations of disease. It will soon undergo formal clinical trials.

At Stanford University, several medical expert systems have been designed. Mycin diagnoses blood and meningitis infections, then advises the physician on antibiotic therapies for treating the infections. Like every other expert system, Mycin acts as a consultant having a conversation with its user, the physician. The physician supplies the patient history and laboratory test results — external data the computer could not possibly infer — and then the program begins to reason about possible diagnoses.

Still other expert systems in medicine exist for digitalis dosing, glaucoma diagnosis and treatment, renal disease, arthritis and rheumatism, fetal illnesses and even the development of new drugs.

In biology, an expert system called Molgen, for Molecular Genetics, gives advice on gene cloning in genetic engineering and helps molecular biologists analyze DNA sequence data. Molgen will take a statement of the goal of a gene cloning experiment from a genetic engineer and produce one or more plausible experiment plans for achieving that particular cloning — advising on the details of the necessary but intricate steps that must be performed in the lab to achieve the cloning.

Knowledge-based approaches to speech and image understanding by computer have been under way for some time. Understanding of continuous speech (as opposed to mere recognition of individual words) started at Carnegie-Mellon and other places in the 1970s and began to be successful when designers were able to add context — knowledge of the topic in addition to knowledge of speech and linguistic

Spinning through software changes and new versions?

Softool's Change and Configuration Control (CCC™) opens the door.

CCC is a software product that automates:
- management of changes
- management of different configurations (versions)
- control over who can make what type of changes and where

CCC can handle anything. It can manage: source code, object code, test data, documents,... and it can deal with programs in any language: Fortran, Cobol, Pascal, C, Ada*, Jovial, Assembly,...

CCC provides every feature you need. It supports automatic reconstruction of previous versions, problem tracking, difference reports, management reports, access control, archiving, compression, encryption, automatic recovery,...

CCC is easy to use. It is interactive and friendly. You need only learn a small set of commands. Help is available on-line. Interactive tutorials are included for both management and programmers. The user interface is the same for all computers supported.

There is more. CCC is a stand-alone component of SOFTOOL®, An integrated Programming Environment is also available.

Our credentials. Over 750 SOFTOOL products are installed worldwide. A growing number of computer manufacturers offer SOFTOOL as part of their product line. These include: Digital Equipment Corporation, Gould S.E.L., Hewlett-Packard and Honeywell.

Available now. SOFTOOL is supported on the DEC VAX, DG MV, Gould S.E.L. 32 series, and IBM 370, 30XX and 43XX computers. It will soon be available for Honeywell 6000, Level 66 and DPS 8, and HP 9000 computers.

Call Softool Corporation for more details or to arrange a hands-on demonstration.

340 South Kellogg Avenue,
Goleta, California 93117
Phone: (805) 964-0560, Telex: 658334

France: Eurosoft, 38, BD Henry Sellier, 92150 Suresnes, Phone: (1)506.18.18
Germany: Sicios-Eurosoft, Brenner Strasse 5, 8000 Munchen 2, Phone: (89)22.23.24
Israel: ATL, Afidim, Neve Sharet, Devora Hanevia Street, Tel Aviv 61130, Phone: 03-491262

Softool Corporation

*Ada® is a trademark of the U.S. Government
DEC and VAX are trademarks of Digital Equipment Corp.

Meet us in St. Louis at DECUS (booth #16) and DEXPO (booth #730).

acts — to the process of understanding. Speech understanding is a special case of a more general problem called signal understanding. Signals can come from any instrument, not just a microphone or a TV camera.

A defense-related application of expert systems in signal interpretation, whose essentials are no longer classified, is Hasp/Siap, a passive sonar surveillance system designed to interpret ocean sounds in very noisy circumstances. To do this by conventional computing methods using statistical techniques, expensive supercomputers would be needed, and even then it is questionable whether the problem is tractable. It made no sense to spend the computing time of a supercomputer, doing cross-correlations and autocorrelations of signals in a massive amount of sonar data when, in fact, most of the information needed for the correct interpretation wasn't present in that signal but was to be found in the knowledge surrounding the situation. What knowledge? The hefty intelligence manuals on a shelf, information from spies, what the neighboring station saw yesterday, what's normal, the fact that it's winter and not summer, what the

Systems as Intellectual Support

An expert system is a computer program that has built into it the knowledge and capability that will allow it to operate at the expert's level. Expert performance means, for example, the level of performance of M.D.'s doing diagnosis and therapeutics or Ph.D.'s or very experienced people doing engineering, scientific or managerial tasks. The expert system is a high-level intellectual support for the human expert, which explains its other name, *intelligent assistant*.

Expert systems are usually built to be able to explain the lines of reasoning that led to their decisions. Some can even explain why they rejected certain paths of reasoning and chose others. This transparency is a major feature of expert systems. Designers work hard to achieve it because they understand that the ultimate use of the system will depend upon its credibility to its users, and credibility will arise because the behavior is transparent, explainable.

The dual usage, "knowledge-based systems" and "expert systems," violates the precision some scientists favor. In brief, a system that can understand images or speech may rely on a large knowledge base to achieve its perceptions, but it doesn't call on any special human expertise to do it. Normal human beings are born with eyes, ears and the equipment behind them to process the signals those organs receive, and they acquire quickly the knowledge needed to understand the signals. But normal humans are not born knowing, and do not quickly learn, how to manage a large construction project or diagnose a disease; that takes expertise, learned over a long period. Other scientists find this distinction pedantic, and a little linguistic chauvinism has even emerged. The term "knowledge engineering" finds favor with the Japanese, because engineers have high status in Japan, but engineers don't enjoy such glory in the UK, which favors "expert systems." So it goes.

Expert systems operate particularly well where the thinking is mostly reasoning, not calculating — and that means most of the world's work. Even though a lot of professional work seems to be expressed in mathematical formulas, in fact, except in mathematically based sciences, the difficult choices are symbolic, inferential and rooted in experiential knowledge. Human experts have acquired their expertise not only from explicit knowledge found in textbooks and lectures, but also from experience: by doing things again and again, failing, succeeding, wasting time and effort, then learning to save them, getting a feel for a problem, learning when to go by the book and when to break the rules. They therefore build up a repertory of working rules of thumb, or "heuristics," which, combined with book knowledge, make them experts.

BUILDING A COMPUTER CENTER?

If you're planning a new, expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of products and services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to the smallest support equipment, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, contractors and suppliers specializing in computer facilities.

Supplying a full line of support equipment, including:

- *Uninterruptible Power Systems*
- *Computer Power Centers*
- *Computer Fire Protection Systems*
- *Computer Type Air Conditioning*
- *Gas Turbines/Diesel Generators*
- *Elevated Flooring*
- *Custom Consoles*
- *Line Filters*
- *Systems Monitors*
- *Voltage Regulators*
- *Frequency Converters*

CALL DATASPHERE NOW!

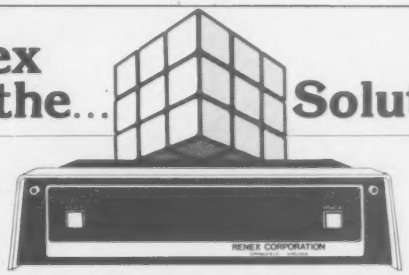
800-221-0575

In New Jersey call 201/272-1810

Write for additional information.

datasphere, Inc. *49 Meeker Avenue · Cranford, New Jersey 07016*

Renex has the... Solution!



ASCII • Personal Computers • KSR Devices • Printers To 3270 SNA/SDLC or BSC

The Renex TRANSLATOR, a powerful field proven communication controller lets you give IBM 3270 data processing capabilities to more of your personnel for less money. Renex eliminates the high cost of IBM dependence when expanding your 3270 networking system.

The TRANSLATOR can let almost any asynchronous ASCII terminal, CRT, printer and personal computer talk to a host as if it was an IBM 327X or 328X. You can choose from over one-hundred models of terminals—pick the one that suits your needs and your pocketbook.

Features:

- 4, 8, 12, 16, 20, 24, 32 asynchronous ports
- Full (seven) color and extended highlighting
- Dial-up or direct connect
- ABRD to 19.2K baud
- Password protection
- No host software changes
- Menu driven setup
- Battery backup memory
- Internal clocking to 9600 baud
- IBM 3278 and 3279 look-alike terminals available

Benefits:

- Access the network from anywhere
- Choice of terminals or printers
- Lower cost per port and per station
- Eliminate need for multiple terminals
- Mix personal computers and asynchronous terminals
- Process locally then connect to the 3270 network

Call or send for more details today.

RENEX CORPORATION

6901 Old Keene Mill Road
Springfield, VA 22150
(703) 451-2200 TWX 710-831-0237

IN DEPTH

newspapers said about merchant shipping traffic and so forth. Reasoning with all that knowledge is much more important than trying to dig a little bit of signal out of a lot of noise.

In tests performed by defense scientists, the Hasp/Siap program performed at levels equal to and sometimes exceeding human performance. The designers estimated that by "doing it smart," reasoning from knowledge, a saving of a factor of 100 to 1,000 was possible in the amount of computing needed. That translates into a big saving in defense dollars. Similar savings by "doing it smart" were evident in the Dendral project. Because the Dendral program knew so much about chemistry and the methods of mass spectrometry, and because it was so systematic in its reasoning, it could solve chemical structure problems using low-resolution spectral data that chemists could solve handily at that time only by using high-resolution instruments. Inexpensive low-resolution instrumentation plus knowledge-based reasoning equaled the performance of expensive high-resolution instruments.

'Intelligent machines open up a world of possibility, speculation and intellectual enrichment that could be — and for our children will be — the intellectual's instrument par excellence.'

Intellectuals And the New Generation

Since the fifth generation — the mass production of intelligent machines — is comparable in human intellectual history to the invention of the printing press, with the certainty of making even greater changes in the life of the mind than books did, we might expect that American intellectuals (in particular those who still talk so reverently about the values of a liberal education, the sharing of the common culture and so on) are eager to mold this new technology to serve the best human ends it possibly can.

Unfortunately, they are not. Most of them haven't the faintest idea what's happening. If they notice at all, they see the computerization of university campuses, say, as the new barbarism.

"Our Fascination With Electronic Technology Is Myopic — and Quintessentially American" is the title of a recent essay in *The Chronicle of Higher Education*, a trade paper for academics. Its author, a professor of English, rushes to establish his bona fides: "I'm no 20th-century Luddite, rioting against machinery because it threatens an older world of handicrafts. Is it Luddism to believe that extreme love of machinery is unhealthy? That a society with an adolescent lust for its own technology is decadent?" Not Luddism, we'd say, just a misapprehension of the revolution, a confusion of means and ends.

To the computing illiterate, computer users' hunger for intellectual power and expansion looks like lust for gadgetry. In part, it is. So what? Who holds against us that we collect beautiful books with fine bindings and carefully chosen typefaces at the same time we honor what those books contain? What's wrong with admiring a beautifully designed computer or a clever piece of code, human artifacts both? But the main eagerness that propels youngsters to

Nobody puts it all together like Zytron.

Our micrographic products are basic to better information systems.

As an industry leader, we've got the expertise and the technical know-how to help you analyze and choose the right micrographic products and services to meet your office information needs.

You get quality products—ranging from microfilm readers and reader-printers, chemistry and film, to office microfilming and CAR systems—that are *pre-tested* for realiability and durability.

Plus, Zytron gives you complete service support in purchase and installation. Product availability and on-time delivery are insured through Zytron's national distribution operation—featuring automated order entry, inventory and tracking systems—linking its network of Servicenters across the country.

And, Zytron offers you the option of buying *or* leasing many of the products you need.

So, you can count on Zytron for cost efficiency and performance. For full-service, and a *full-systems approach* to office information management, turn to Zytron.

Zytron. The intelligent answer.

Zytron

a company of The Dun & Bradstreet Corporation

Executive Office
2200 Sand Hill Road
Menlo Park, California 94025
(415) 854-2306

Call for the Zytron Servicenter nearest you.

REPORT WRITER
for DEC computers
under RSTS and VMS

- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION
305 Madison Avenue, NY, NY 10165 (212) 972-1660

"Graham's Epoch 480 tape is cheaper in the long run because it lasts longer."

Even when you've been making good tape as long as we have, it pays to talk to the experts. People who use it every day. That's why we had a research firm survey our customers and prospects. And that is what one of them said.

He didn't mean Epoch 480 is inexpensive. He meant that for the money, no other tape does quite the job in critical areas like data transfer, back-up and archival storage.

We planned it that way, with the finest binder system we could devise. Because of lower oxide shedding, you get error-free performance pass after pass after pass. In short, Epoch 480 is clean and durable.

We know that being considered the tape company worldwide, we can't deliver anything less than the best. It's just nice to know that the experts know it, too.

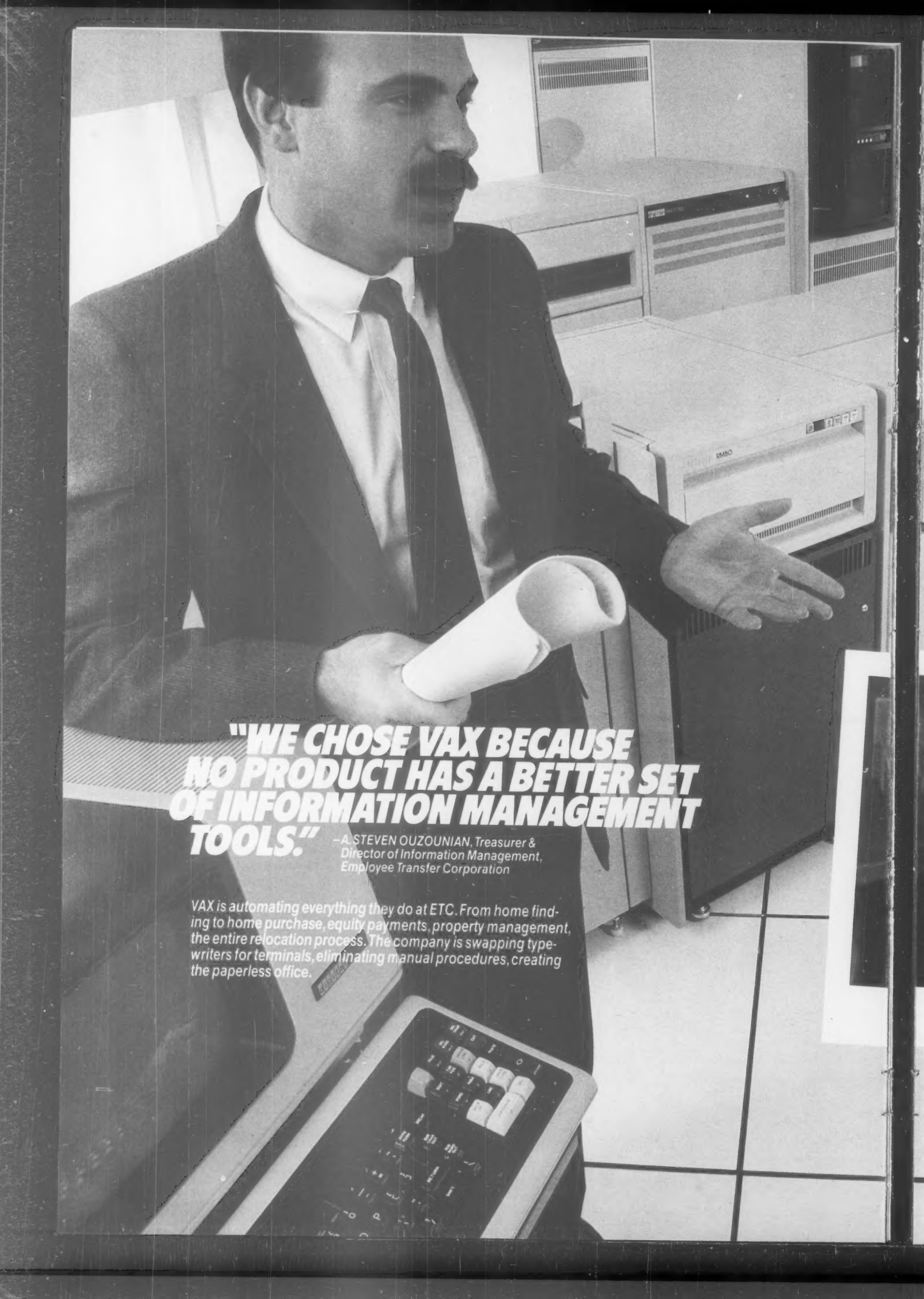
Talk to the Media Management Specialist at Graham Magnetics The tape company.

See you at NCC.
booth numbers S 5607-5608.

GRAHAM MAGNETICS

Toll Free 1-800-433 7632. 433 7633 In Texas. (817) 281 9450

CARLISLE


"WE CHOSE VAX BECAUSE NO PRODUCT HAS A BETTER SET OF INFORMATION MANAGEMENT TOOLS."
– A. STEVEN OUZOUNIAN, Treasurer & Director of Information Management, Employee Transfer Corporation
VAX is automating everything they do at ETC. From home finding to home purchase, equity payments, property management, the entire relocation process. The company is swapping typewriters for terminals, eliminating manual procedures, creating the paperless office.

VAX

At Employee Transfer Corporation they're installing what Steve Ouzounian calls, "the best system in the relocation business for collecting and distributing information.

"We're connecting eleven regional VAX-11/750s with a VAX-11/780-resident data base via DECnet.™ Every aspect of our business is being networked – real estate brokers, available homes, mortgage data, city demographics, all our suppliers and their performance records – this is no trivial data base."

The network is designed to put up-to-date information into the hands of ETC's counselors in five seconds or less anywhere in the country.

"Responsiveness is the key," Steve explains. "Our people can now make the transferee confident about every decision he or she has to make. With VAX™ systems we've got the answer, or the way to find out.

"We shopped hard," Steve recalls, "and VAX Information Architecture clearly had the best integrated, easiest-to-use tools. We're using them all. DBMS, DATATRIEVE™ reporting, FMS forms management, plus ALL-IN-1,™ Digital's new office information package. VAX has catapulted us into the Information Age.

"With Digital's help, we've got VAX systems operating in a mainframe environment. They've met our demanding phase-in schedule, and helped to design a system that expands with our business. Quite simply, they've made us more competitive for years to come."

Meanwhile, it's getting harder and harder at ETC to find a typewriter, or a pencil. Or a question that can't be answered.

Ask us about VAX. Call toll-free: 1-800-DIGITAL, extension 200. Or write: Digital Equipment Corporation, 200 Baker Avenue, Attention: Media Response Manager, CF01/M94, West Concord, MA 01742.

digital

© Digital Equipment Corporation 1983

IN DEPTH

the computer is the same eagerness that propelled earlier generations to literacy in the word.

We can further fault our English professor for not even stirring to discover that the "quintessentially American fascination" is taking place all over the world, in many nations in a more orderly and rational fashion; but at least he has let the matter come to his attention. Most self-styled intellectuals don't even recognize what's happening.

The novelist Hortense Calisher, deep in the middle of a long novel about the space shuttle, wrote an essay about the sublime ignorance and complete lack of interest intellectuals demonstrate in the face of another great human adventure, space exploration. "Among intellectuals who eagerly suffered talk of post-Einstein physics, space exploration as it might touch us humanly was dime store stuff and bad form. (Ditto among the literati.) As for politics, just try deflecting the Middle East worry with the query, 'What do you think of the chances, good or bad, of the U.N. Committee on the Peaceful Uses of Outer Space?' Most I met had never heard of it. Until then, neither had I."

What *are* American intellectuals thinking about, then? A fair question, and not so easy to answer. For one thing, politics, that most evanescent of interests. For another, art, which no one would quarrel with. Perhaps they even ponder their own irrelevance.

Intelligent machines open up a world of possibility, speculation and intellectual enrichment that could be — and for our children will be — the intellectual's instrument par excellence, a means of testing hypotheses, examining theories, playing "what-if" games and reshaping human thought at a level of complexity that no other intellectual tool — certainly not the written word, not any form of graphics we use now or mathematics — has ever been able to provide. The extension of human intellect that the fifth generation will give us is simply staggering.

Knowledge information processing systems allow, almost insist upon, the fusion of many different technologies and human services, from communications technology to health care delivery. The same principle is equally valid and probably even more important in the realm of ideas. Intellectuals and professionals in highly disparate fields often study the same concept to try to understand and use it; but because they have no common language, they cannot help or provide one another with insights they have acquired in their separate ways.

For example, both professors of English and knowledge engineers think very hard — and very practically — about the representation of ideas in language, but virtually no professors of English know anything about the discoveries knowledge engineers have made in their efforts to represent ideas in language, which will then be transformed into representations in a computer.

In short, no plausible claim to intellectuality can possibly be made in the near future without an intimate dependence upon this new instrument. Those intellectuals who persist in their indifference, not to say snobbery, will find themselves stranded in a quaint museum of the intellect, forced to live petulantly, and rather irrelevantly, on the charity of those who understand the real dimensions of the revolution and can deal with the new world it will bring about.

Artificial Intelligence And the National Defense

The U.S. has never felt very comfortable as a nation undertaking a large project merely for the common good of the people. We have managed, however, to spend a lot of money on useful (and not so useful) things as long as we could persuade ourselves it was in the national defense.

Artificial intelligence is foremost among these. When no corporation or foundation chose to take AI seriously, or could afford to, the Advanced Research Projects Agency (Arpa) of the Department of Defense supported it through two decades of absolutely vital but highly risky research. Since the Pentagon is often perceived as the national villain, it

is a pleasure to report that in one enlightened corner of it, human beings were betting taxpayers' money on projects that would have major benefits for the whole human race.

In the late 1970s, as some parts of the technology were ready to move beyond research and into development, venture capitalists and industrialists flocked to AI technical meetings and either adapted the technology to their own needs or set up firms especially to do AI. But the early cultivation had been supported by Arpa, which deserves credit for its enlightened scientific leadership.

Artificial intelligence has gone out into the world, for better or for worse, for commerce or for defense. The Japanese plan to rear this infant to full commercial adulthood. *We believe that Americans should mount a large-scale concentrated project of our own; that not only is it in the national interest to do so, but it is essential to the national defense.*

'No matter how loyal an ally Japan is, it will be simply unacceptable for the U.S. to have to depend on Japan for a vital defense technology.'

The so-called smart weapons of 1982, for all their sophisticated modern electronics, are really just extremely complex wind-up toys compared with the weapons systems that will be possible in a decade if intelligent information processing systems are applied to the defense problems of the 1990s.

In the summer of 1981, Feigenbaum was asked to give scientific testimony on the current state of research and development in AI and expert systems to a panel of the Defense Science Board, the highest-level scientific group that advises the U.S. Department of Defense. The panel's charter was to assess the possible impact of a large number of current technologies (it is rumored that they examined 70 to 80) on the defense of the U.S. In the report of the panel, AI ranked seventh using an opportunity-vs.-risk measure, and second using only an opportunity measure!

Accordingly, it is not surprising that the undersecretary of defense for research and engineering, Richard D. DeLauer, the "R&D chief" of the Pentagon, is quoted as saying, "The Defense Department should press this technology because no one else is pursuing it, and the Japanese have strong programs in both artificial intelligence and fifth-generation computers with a consortium of government, university and industry development."

We agree with DeLauer's assessment and would like to support it with five points.

The first looks with awe at the peculiar nature of modern electronic warfare that allows a marginal technological edge (a "shade of gray," in military technology) to be converted by the happy (*not* lucky) holders of that edge into a military result of total dominance ("black and white"). In preparation for the confrontation with Syrian MiG jets by their American-made jet fighters in the 1982 Lebanese war, the Israelis had improved the electronic systems of their planes, which otherwise were more or less the equals of the Russian-made fighters. They improved their electronic countermeasures and, most important, they invented and developed a remarkable plan for "reading" Syrian electronic emissions and commanding their electronic air battle on the basis of the "whats" and "wheres" that these signals revealed.

One result was that they completely confused the Syrian command-and-control system defending Syrian surface-to-air missile sites and succeeded in destroying most of those missiles. The major result, however, was the final score: 79-0 in airplanes destroyed. This amazing result was achieved largely by intelligent human electronic battle management. In the future, it can and

...that does Spreadsheet and Forecasting, Divisional Accounting and Order Entry Word Processing and Electronic Mail, Communications in our 3270 Network, and runs our existing Fortran '77 Engineering Programs."

...I Found MPC

When my boss discovered MPC's built-in flexibility, even *he* was impressed.

Hardware
- Powerful 16 bit architecture
- Virtually unlimited upgrade potential
- Up to: 1mb memory per station
  320mb disk storage per station
  16 stations per cluster
- Standalone or clustered processing

Software
- Multi function, multi tasking OS
- Languages: ANSI COBOL, BASIC, PASCAL FORTRAN, FORTRAN '77, ASSEMBLER
- Communications: TTY, X.25, 3270, 2780/3780, SNA
- Powerful bit-mapped graphics
- Extensive user software availability

Support
- Worldwide field maintenance organization
- Field software support
- Worldwide distribution network for immediate availability and installation
- Extensive user training available

200-300 CONFIGURATIONS

	200	300
RAM capacity	256k to 512k bytes	256k to 1 M bytes
Mass storage options	1 or 2 5¼" floppy (630kB each) 5¼" Winchester (5, 10, or 16 MB)	1 or 2 8" floppy (500kB each) 8" Winchester (10,20, or 40 MB) SMD Storage Module (up to 1.2 GB)
*Multibus slots	N/A	2 or 5 (1 or 4 in Graphics Workstations)
Video display	28 x 80	34 x 132 (max.)

*Multibus is a registered trademark of Intel Corporation.

Contact Your Nearest MPC Distributor

■ **Kierulff Electronics:** Call your Kierulff division ■ **Computer Peripherals,** Richardson, TX (214) 644-3606 ■ **Dayton-Forrester Associates,** Canoga Park, CA (213) 701-0127 ■ **Digital Solutions,** Marietta, GA (404) 955-4488 ■ **Procom Sales,** Elk Grove, IL (312) 860-1028 ■ **The Tricom Group,** Hicksville, NY (516) 681-1222 ■ **Mid-Com Communications Inc:** Southfield, MI (313) 353-5696 ■ **Computer Dataco:** Kansas City, MO (816) 221-1212 ■ **Peripheral Business Systems,** Kirkland, WA (206) 823-6661 ■ **Peripheral Equipment,** Pleasant Grove, UT (801) 785-5009 ■ **Dynamic Systems North West,** Mukilteo, WA (206) 745-5311 ■ **RC Data,** San Jose, CA (408) 946-3800

a division of C3 Inc.

MPC

Micro Products Company
Rte 634 & Acacia Lane
Post Office Box 198
Sterling, Virginia 22170
Telex: 901755
Phone: (703) 430-1800

C3 Inc.
Kingewick House
Summinghill, Berkshire
England SL57BJ
Telex: (851) 848980
Ph: Asset (C990) 23491

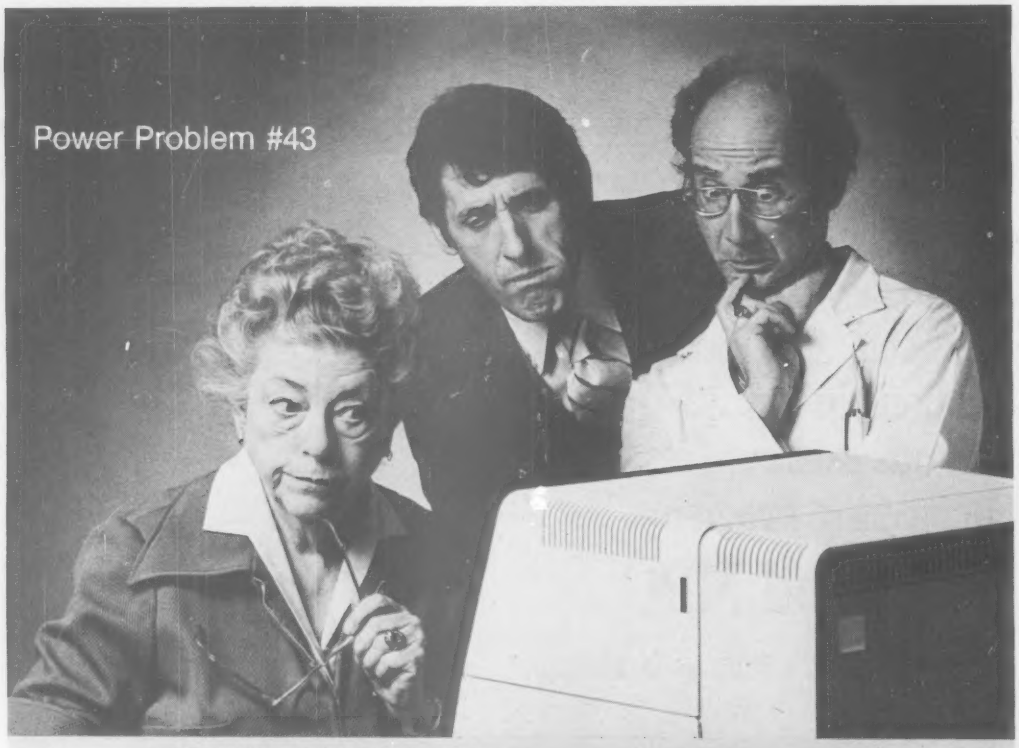
IN DEPTH

will be done by computer.

Second, there is the question of access by the Department of Defense to the technology of the intelligent computer systems of the future. If the Defense Science Board's study is even approximately correct, we cannot afford to allow the AI technology to slip away to the Japanese or to anyone else. No matter how loyal an ally Japan is, it will be simply unacceptable for the U.S. to have to depend on Japan for a vital defense technology. And we cannot assume that our Japanese allies will automatically acquiesce to the imposition of export technology controls that we may deem vital to our defense interests. Japan, as a nation, has a longstanding casual attitude toward secrecy when it comes to technological matters. Except in the firms, Japan is regarded by its allies as a virtual sieve for Western technology to flow indiscriminately into others' hands.

The third point has to do with the skyrocketing costs of U.S. defense. While Congress debates huge appropriations for conventional weaponry, the issue of "smart bombs" takes on a new interest. In defense applications, the objective for any weaponry utilizing expert systems is *zero probability of error*, which means that individual targets will be sought out by sensing devices informed by intelligence data, eliminating the need for massive blanket bombing to achieve desired objectives. The economic impact of an intelligent armaments system that can strike targets with extreme precision should be apparent to even the most ardent national defense advocates — fewer weapons used selectively for maximum strike capability.

Fourth, it is essential that the newest technological developments be made available to the Defense Department. Technological leads are usually short-lived. We must retain the capability to accelerate the passage of technology from laboratory to military system under our control using our defense contractors. We cannot afford to be in the position of



HOW DO YOU STOP POWER DISTURBANCES FROM CAUSING COMPUTER CONFUSION?

Answer: With a Topaz Power Conditioner.

Ordinary AC power often confuses computers. Transient electrical impulses (noise) can be misread by a computer, causing untraceable data entry. Common voltage fluctuations can cause memory losses, system malfunctions and even hardware damage.

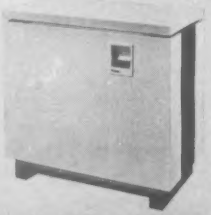
Topaz Power Conditioners eliminate these types of problems. Installed between the power source and your computer, a Topaz Power Conditioner continuously provides stable, noise free power to all your sensitive equipment.

Topaz Power Conditioners feature PowerLogic™, the most advanced power conditioning technology ever developed. PowerLogic employs microcomputer control for fast, accurate performance and for maximum reliability and servicing ease. Other Power Conditioner features include energy-saving high efficiency and exceptionally low output impedance for maximum performance.

Don't let power disturbances baffle your computer. Protect it with a Topaz microcomputer-controlled Power Conditioner. All models are available for immediate shipment.

For more information, return this ad with your name and address, mark the reader service card, or call us:

Topaz Electronics Division
3855 Ruffin Road
San Diego, CA 92123
(619) 279-0831
TWX 910-335-1526



TOPAZ
SOLUTIONS TO POWER PROBLEMS™

SPF/PC™

NO IBM computer, large or small, is complete without SPF. The IBM/PC is no exception.

SPF/PC, a full-screen editor with integrated utilities, is the answer for the PC.

It looks and works like IBM's large system editor ISPF.

- SPF/PC can use up to 786K of memory as workspace.
- Word processing commands.
- 4-way scrolling.
- Split screen support.
- On-line help facility.
- Monochrome or color support.
- Instantaneous screen display.
- Block Move/Copy/Repeat/Delete/ Overlay/Shift

And much more . . .

$99.95 Mastercard/Visa, Check, or P.O. accepted. Add $5.00 for shipping.

For orders and dealer information write or call Rogue River Software, 2822 Tahitian Ave., Medford, OR 97501, (503) 779-3002.

SPF/PC is a trademark of Rogue River Software. IBM is a registered trademark of International Business Machines, Inc.

PC'83 BOOTH 154

waiting for the Japanese to push products through their development cycle to the commercial marketplace.

Finally, the Defense Department needs the ability to shape technology to conform to its needs in military systems. A Fujitsu or a Hitachi marches to a different drummer from a Rockwell or a Lockheed. Our defense industry must obtain and retain a strong position in the new advanced computer technologies.

Until recently, the U.S. has led the information revolution. Our semiconductor technology was recognized as the best, but no longer. The outcome of the great chip wars of the early 1980s is not final, but for many important hardware components, Japan is ahead. Japanese supercomputers are comparable to American ones. Japan is moving into other kinds of hardware and into software development. If we doubt that diligent nation's ability to do the same for machine intelligence by the end of 10 years, we need merely look back 10 years to see where Japan was in computing technology then. The simple answer is nowhere.

Aside from direct combat — which, if it is nuclear, makes everything discussed here irrelevant, we hasten to say — our industrial base is a vital part of our national defense. If industry continues to be run by old-fashioned methods using old-fashioned technology, it will be nothing but a costly white elephant to us.

There has been much talk about the reindustrialization of the U.S., and it is no doubt a good idea; but its success will rely on the large-scale integration of intelligence and knowledge technology into industrial processes.

Robert Kahn of Arpa's Information Processing Techniques Office sat and mused on this situation one sunny afternoon not long ago. "Yes," he said, "Arpa has acted as the conscience of information processing research in the U.S. We virtually had to thrust the Arpanet down the throats of the computer science community, and now they can't function effectively without it. In the past, things were different. So what if IBM was slow to introduce time-sharing and virtual memory? So what if it took AT&T 10 years to come around on packet switching? It didn't matter very much because time was on our side, the industry was strong and we could afford to wait.

"But it's not as strong now and the competition is much greater. Like General Motors, it's beset by competition it

FusiCalc™
On IBM/38?

Call for details about FUSION 3, 'Electronic Worksheet' and Financial Modelling System.

FUSION
PRODUCTS INTERNATIONAL

(415) 381-1340
PO Box Fusion
Mill Valley, CA 94942
Telex 176099 FUSION

NOW YOUR WANG, IBM 5520 & XEROX SYSTEMS CAN TALK AMONGST THEMSELVES

If you have more than one make of word processor within your company, chances are you cannot pass documents between them. Unless you have a Codem protocol translator.

Using the Codem avoids expensive rekeying and editing, overcomes format incompatibilities and maintains document integrity during transmission.

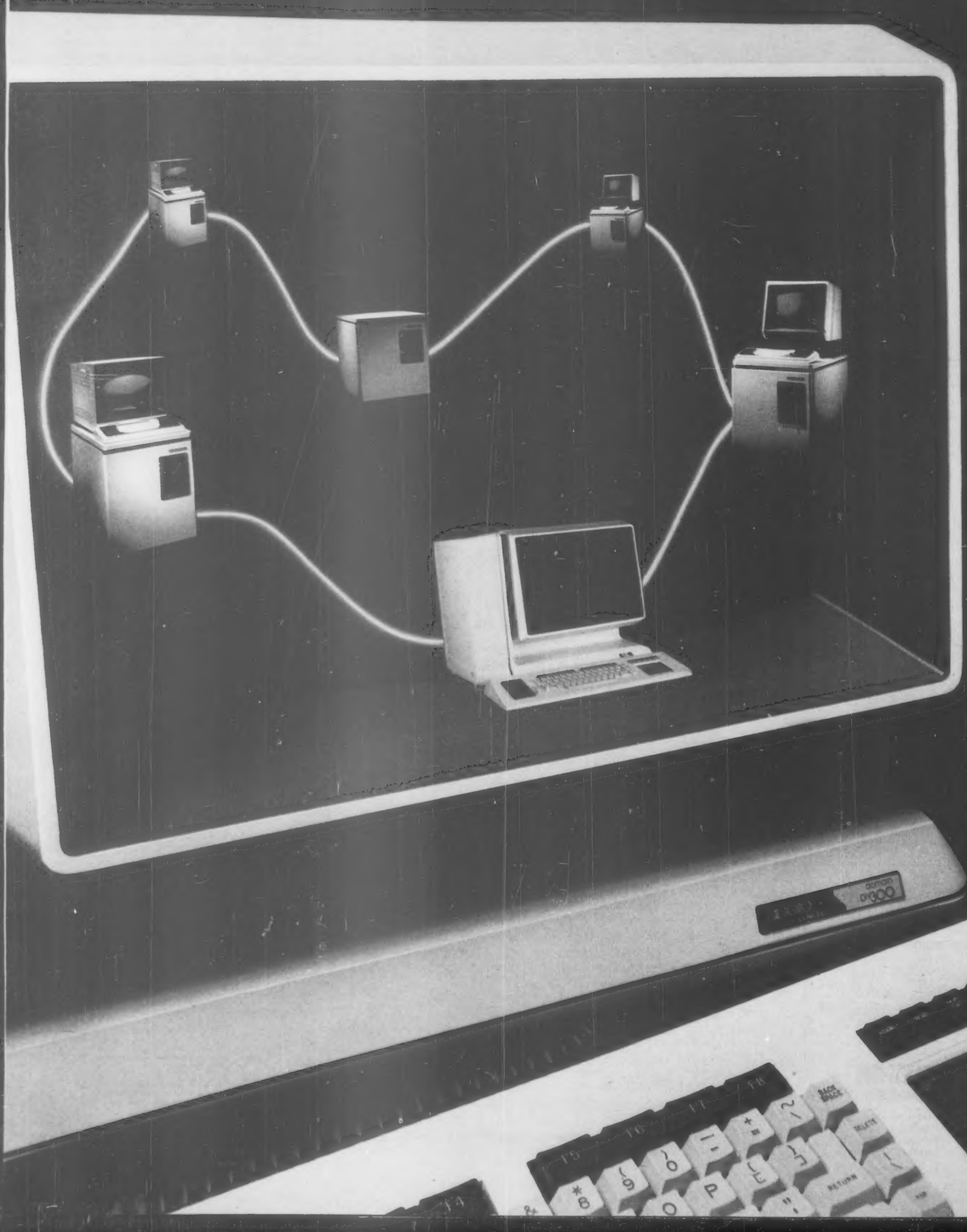
The Codem can link systems using either asynchronous or bisynchronous communication protocols. Typical links have been forged between: Wang, IBM 5520, Xerox word processors, Xerox Laserprinters, Vydec, Wordplex, CPT.

Please send me further details on the Codem
I want a _____ to talk to a _____
They do/do not have Comms Ports
Name _____
Company _____
Address _____
City _____ State _____
Zip _____ Phone _____

FORMSCAN

FormScan Inc., One Huntington Quadrangle, Suite 2C10, Melville, New York 11747. (516) 752-0032.

Introducing:



the $10,000 desktop mainframe.

THE NEW APOLLO DN300 WILL COMPLETELY CHANGE THE WAY TECHNICAL PROFESSIONALS USE COMPUTERS.

The DN300 is quite possibly the single most important computer system ever introduced for the technical professional. For the first time ever, these technical professionals have fingertip access to a desktop mainframe, and all the power that goes with it. The power to utilize time in the most efficient possible way. The power to increase technical productivity and innovation. The power to try out and refine new ideas and concepts. The power to reduce design-time cycles. The power to create better, more cost-effective products.

In a unit that takes no more space than a daily newspaper, the DN300 gives you a high performance, 32-bit virtual memory processor, high-resolution bit map graphics, and an integrated local area network that provides network-wide virtual memory access.

The DN300, latest in the family of DOMAIN processing nodes, supports up to 1.5 million bytes of main memory and 15 concurrent processes of 16 million bytes each, so you can execute large programs. Its 17-inch 1024 x 800 pixel landscape display provides the high-resolution graphics you need for technical applications. The 12 million bit-per-second high speed token-passing network lets you access data anywhere in the network without sacrificing performance. And the DN300 is supported by an optional local hard disk as well as a full complement of network peripherals and gateways.

The DN300 is fully compatible with Apollo's DN400, DN420, and DN600 color computational nodes and supports the same multiprogramming environment, large virtual address space, network communications, multi-window display management, and extensive command library as other DOMAIN nodes. The DN300 connects directly and easily to any new or existing Apollo DOMAIN network. Or it can be used as a standalone workstation. Which means that you can configure the type of network that exactly suits your staff and working environment.

SOFTWARE YOU NEVER THOUGHT YOU'D SEE ON YOUR DESKTOP.

Standard with every DN300 node is AEGIS, the only network-wide virtual memory operating system available today.

Optional software includes ANSI-standard FORTRAN 77, Pascal, C, SIGGRAPH Core Graphics Library, X.25, IBM HASP, IBM 3270, D3M distributed database management system and AUX, a software environment based on UNIX™ System III.

More than 50 available third party application software packages include MSC/NASTRAN and ANSYS, two highly regarded finite element analysis programs; PATRAN-G, an interactive finite element pre- and post-processor; SCRIBE, a text formatting and document production system; and DISSPLA and TELL-A-GRAF, the leading data representation graphics software packages.

NEW DOMAIN SERVER PROCESSOR—A LOW COST WAY TO HANDLE NETWORK PERIPHERALS AND GATEWAYS.

The new DSP80, an intelligent peripheral server that connects to the Apollo DOMAIN network, lets users freely share the same, centrally located peripherals. That relieves individual nodes of the burden of peripheral support. So nodes have more time and more power available to handle specific application-related computing.

And you save money by sharing your expensive peripherals—disks, tape drives, printers and plotters. The DSP80 also provides every user with access to specialized services such as communication gateways, large-scale file storage, and print/plot spooling.

USA price $9,933, system builder, quantity 35 DN300 with .5Mb memory, 17-inch graphics display, network interface, and AEGIS operating system.

UNIX is a trademark of Bell Laboratories.

ANSYS is a registered trademark of Swanson Analysis Systems, Inc.

DISSPLA and TELL-A-GRAF are registered trademarks of Integrated Software Systems Corporation

SCRIBE is a registered trademark of UNILOGIC, Ltd.

FIND OUT MORE ABOUT THE DN300 DESKTOP MAINFRAME.

The Domain network gives you low entry cost, high performance, easy and natural incremental growth, reliability, and long-term investment protection. And it gives your technical staff the excitement and satisfaction of working with an innovative, highly productive new tool. For more information on the Apollo Domain processing system, call Apollo's marketing department at (617) 256-6600, extension 608, or write Apollo Computer Inc., 15 Elizabeth Drive, Chelmsford, MA 01824, attention Marketing Communications.

☐ Send me more information on Domain Processing.
☐ Please have a sales representative call me.

Name

Title

Company

Street

City

State

Zip

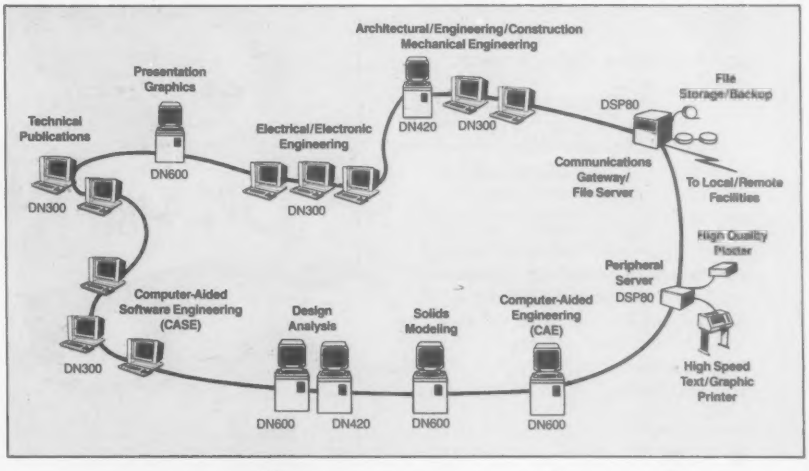
Telephone

Apollo Computer Inc.
15 Elizabeth Drive, Chelmsford, MA 01824

A Domain professional productivity network puts an application specific mainframe on every user's desktop.

The truly exciting aspect of a Domain network is its ideal combination of individual initiative and teamwork. Users get not only the benefits of a high performance, 32-bit computer dedicated to their application, but also retain the benefit of shared resources.

For example, use the DN600 full color graphics computational node for solids modeling, VLSI CAD, finite element analysis, pre- and post-processing, 3-D drafting, and image analysis. Or use it as a full-function CAE workstation . . . The DN420 and DN400 handle the same applications except in monochrome. Use the economical new DN300 desktop mainframe in applications such as computer-aided software engineering, design documentation, high-quality presentation graphics, engineering and manufacturing database management, drafting, and electrical design capture and simulation.



apollo computer inc.
Domain: The Next Generation

IN DEPTH

once dreamed would never exist. At the same time, markets are opening up it hadn't anticipated and is slowly learning how to serve. High tech isn't just for breakfast anymore. Yet nobody knows quite what to do or where to go; there's no place providing the necessary leadership or the catalysts to keep us competitive. In the past, the industries or the government could get together and set standards — that happened with the railroads and it happened in high-

'At the moment, we Americans are placing our economic and defense bets on wholly decentralized planning, cutthroat competition and a touching faith that the best will win because economic laws work that way.'

ways, it happened in radio and TV. But we can't do that very effectively with electronics and particularly software; changes are happening now or need to happen next Tuesday; and what's more, those changes are often invisible." Such problems are now well beyond the scope of one small government agency to solve, no matter how visionary it is.

We calculate that in 1982, the aggregate spent in the U.S. on artificial intelligence research from all sources, governmental and private, was about $50 million. This sum just about equals the amount the Japanese government expects to spend on an average per year over the next 10 years for its fifth generation (not counting Japanese internal industrial AI support, which may double or triple the amount). If we continue as we have, we two nations will act as guinea pigs for an interesting experiment in planned, as opposed to unplanned, research.

At the moment, we Americans are placing our economic and defense bets on a method that has more or less worked for us in the past (though our current economic situation throws some doubt on its utility in a complex postindustrial world). That method, of course, is wholly decentralized planning, cutthroat competition and a touching faith that the best will win because economic laws work that way.

The Japanese part of the experiment is different. Although it parallels our notions of economic competition at the end of the process, it separates that part from the beginning of the process, the research and development of goods, in this case, knowledge technology. Research and development, the Japanese believe, require some central planning. Though individual pieces of research are to be contracted out to various laboratories, such research will be coordinated by workers at the Institute for New Generation Computer Technology in Tokyo. The Japanese believe that human intelligence is a precious resource that must be carefully deployed. Money is also precious and cannot be wasted.

We, on the contrary, are currently betting that uncoordinated development of the information processing industry is a luxury we can still afford. We are behaving as if we have talent to spare and can use it on projects important or frivolous, depending on who has cash to put up. We behave as if there's plenty of such cash. On these assumptions a critical part of our national defense depends.

Alternatives for America

The Japanese have announced that in 10 years they will produce knowledge information processors. Several options are open to Americans, but few of them offer truly palatable alternatives to undertaking our own version. Let us examine them.

1. We can maintain the status quo. We can continue doing a lot of short-term (shortsighted, in the view of many) research and development, spurred by nothing but immediate market considerations. We can penalize the farsighted by removing

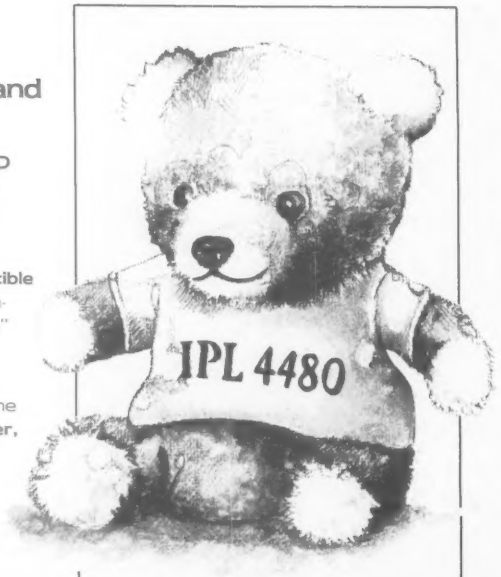
If IBM made a 4300 Computer...

- Fault-Tolerant
- More Powerful
- More Flexible
- More Serviceable, and
- Less Expensive

THEN IT WOULD BE AS GOOD A CHOICE AS THE IPL 4480 CONTINUOUS COMPATIBLE COMPUTER!

IPL's 4480 **Continuous Compatible Computer.** Bringing a new dimension in performance and "uptime" availability to IBM-compatible computers.

For more information about the **Continuous Compatible Computer,** contact Manager of Marketing Support at IPL Systems, Inc., 1370 Main Street, Waltham, Massachusetts 02254. 617-890-6620



ipl SYSTEMS INC.
Advancing Information Processing

Kodak gives computer photographic memory.

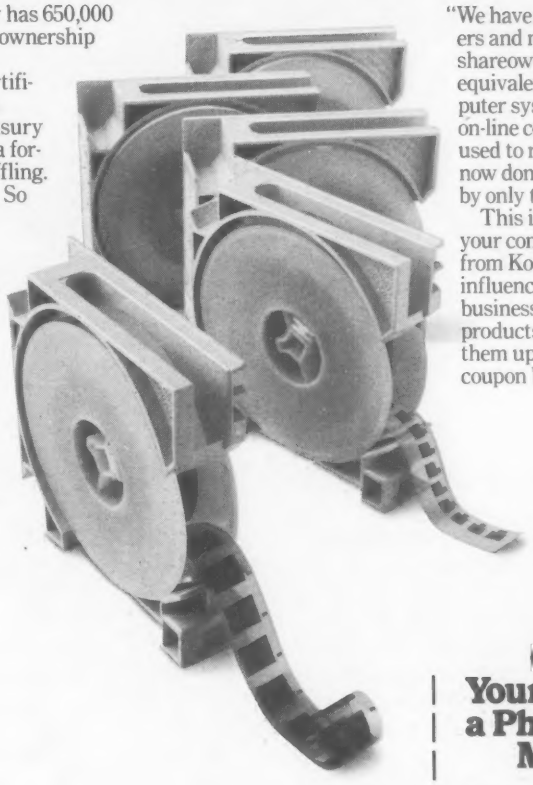
Company erases 13-mile printout.

This large industrial company has 650,000 separate accounts in its stock ownership files.

Because new ownership certificates sometimes numbered as many as 9,000 a day, their treasury operations department faced a formidable amount of paper shuffling.

They asked Kodak for help. So Kodak gave their computer a photographic memory.

Three Kodak IMT-150 microimage terminals, driven by minicomputers, now give them immediate access to any of 80,000 pages of conventional computer paper imaged on five rolls of 16 mm microfilm. These five rolls of microfilm hold information equivalent to 13 miles of computer printouts.



"We have married the technologies of computers and microfilm," says the manager of shareowner records. "We now have the equivalent of a completely on-line computer system without incurring expensive on-line computer costs." And, a task that used to require twelve people full-time is now done faster and with more security by only three people.

This is only one example of how giving your computer a photographic memory from Kodak can help you win friends and influence your bottom line. No matter what business you're engaged in, Kodak has products to help you, and the people to back them up. To find out more, just fill in the coupon below.

Give Your Computer a Photographic Memory.

Eastman Kodak Company,
Business Systems Markets Division,
Dept. DP3559 Rochester, NY 14650

☐ Please send me more information about giving my computer a photographic memory.

☐ Please have a Kodak representative contact me.

Name

Title

Company

Address

City State Zip

Phone

Kodak

© Eastman Kodak Company, 1983

IN DEPTH

them from power, industrial or political, every time the bottom line fails to give us instant gratification. We can embrace antitrust as infallible revelation and litigate ourselves into national collapse. Uncoordinated planning, investments in the frivolous and lack of investment in the serious might still allow us to muddle through — somehow.

2. We can form industrial consortiums to meet the Japanese challenge and, as citizens, insist that the Justice Department take a reasonable stance regarding joint industrial R&D. This effort might take an act of Congress. Americans, however, have little experience with such joint ventures.

3. We could enter a major joint venture with the Japanese. Their fifth-generation proposal gives a lot of lip service to international cooperation. They might not have really meant it, but we could give their lip service a test. There is also the possibility that as the conclusions of various phases of the project approach, the Japanese might find themselves falling short of their targets — either technologically or financially — and would welcome American collaboration. The U.S. and Japan would complement each other, and the joint venture could be powerful internationally.

4. As a variation on the third plan, we know that the economic value of Kips (the so-called value added) is primarily in their software, or their knowledge, and we have a proven record as specialists in great software ideas. We could forget about producing the machines and produce only the software instead, styling ourselves after the razor blade company that gave away razors because profits were in the blades. Chips are cheap, and we've seen competition drive profits out of many segments of the computer hardware business. Let's make software instead. In software, capital investment can be low and profits huge.

5. We can form a national laboratory for the promotion of knowledge technology. It might be a mega-institute, like Los Alamos, embracing all forms of knowledge technology. Or it might be a smaller multiple-university-run laboratory (such as Brookhaven and Fermilab in physics). Or it might have one university as the prime contractor (like the Stanford Linear Accelerator Center).

Whatever form it takes,

DP USER DIRECTORIES
NY Metro-Tri-State/NY, NJ & CT
New England/ME, NH, VT, MA & RI
Mid-Atlantic/PA, MD, WV, VA, DE, DC
• The Source to Multi-Billion Dollar Markets
• The "Who's Who" of EDP Decision Makers
• 9,250-15,250 Top Computer Executives per Directory.
• 3,000-5,000 Computer User-Sites/Region
• Installed Mainframes & Minicomputers Listed
• FUTURE PLANS: Projected upgrades, discards, acquisitions of hardware and software specified with dates in user section and index.
• Fortune 500, Fortune 1000 and major non-industrial companies listed.
• RJE & Timesharing with computers at other locations specified in user section and hardware index.
• Company, division, address, industry, main phone #, contact's name, title, functional area, direct phone # or ext., major hardware installed, major *software* used, *consultants* used, applications, & misc. info.
• 117 indexes by type of Hardware, Software & Industry (e.g. CICS/IMS/VM/IBM 303X's/DEC PDP/RPG II/COBOL/etc.
• Key Financial Executives & EDP Recruiters listed.
• Chain of command of executive personnel indicated.
• Labels, index cards, print-outs, mag. tapes & market research are available.
• Advertise in Vendor Directory
PRICE - $125.00 ORDER - Mail check to:
Computer Management Research, Inc.
20 Waterside Plaza, Suite 1-C
New York, NY 10010
212-683-0606

A simple analogy that explains why Plexus

The division of labor.

A very simple idea that says when you divide a job up among a lot of people or machines, the job goes faster.

In our case, this principle translates to a multiprocessor architecture, up to seven, to be exact.

And that's the reason our family of four UNIX™-based systems will get you where you want to go. Very quickly.

Multiprocessors. No waiting.

Most commercial UNIX-based systems being peddled these days rely on a single processor to do everything. No wonder they drag their feet as system loading increases.

Not us. We're all speed. All the time.

We distributed the UNIX operating system to where it does the most good.

Our 16-bit Intelligent Communications Processors rush terminal I/O to and from as many as 40 users. While also taking care of low level communications so as not to interrupt the CPU.

Our 16-bit Mass Storage Processors handle disk I/O chores. So you get fast disk access and can keep data bases and important files easily accessible.

The performance that results is close to that of a VAX™ 11/780.

And costs about $200,000 less.

The Plexus Family. Speedsters all.

There's our Z8000 series, the economical 16-user P/25, or the 40-user P/40.

Or choose the newly introduced P/35 or P/60 models for 32-bit performance.

They're both based on the 12.5 MHz MC68000. With the addition of a few, shall we say, high performance modifications.

Like an on-board 4K cache memory. 16K of high-speed on-board RAM. A high-speed memory map. And a 32-bit memory path.

the national laboratory must be newly created. Institutions have a natural life cycle, being most energetic and creative when new and unbureaucratic. We cannot look at the existing national laboratories for the kind of innovations a knowledge technology laboratory must produce, freighted as they are with tradition, stodginess and bureaucracy.

6. We can prepare to become the first great agrarian postindustrial society. We are blessed with huge tracts of fertile, arable land. Progress in our agrosciences and in automation applied to agriculture has always been impressive. We absolutely shine in growing things. As General Motors and General Electric decline, we can organize General Agriculture to maintain our balance of trade.

Yet another alternative, a center for knowledge technology, is described on In Depth/4.

The Japanese understand perfectly that a superiority in knowledge technology provides whoever holds it with the power to resolve shades of gray into black and white — provides, in brief, an unequivocal advantage — whether we are speaking of personal power, national economics or warfare. They have already begun to translate that understanding into the new technology that will give them unequivocal advantage over the rest of the world, perhaps by the middle of the next decade.

Other nations recognize the soundness of the Japanese strategy. In response to the farsighted Japanese, ambitious national plans are being drawn up in many places. But the U.S., which ought to lead in such plans, trails along in disarrayed and diffuse indecision.

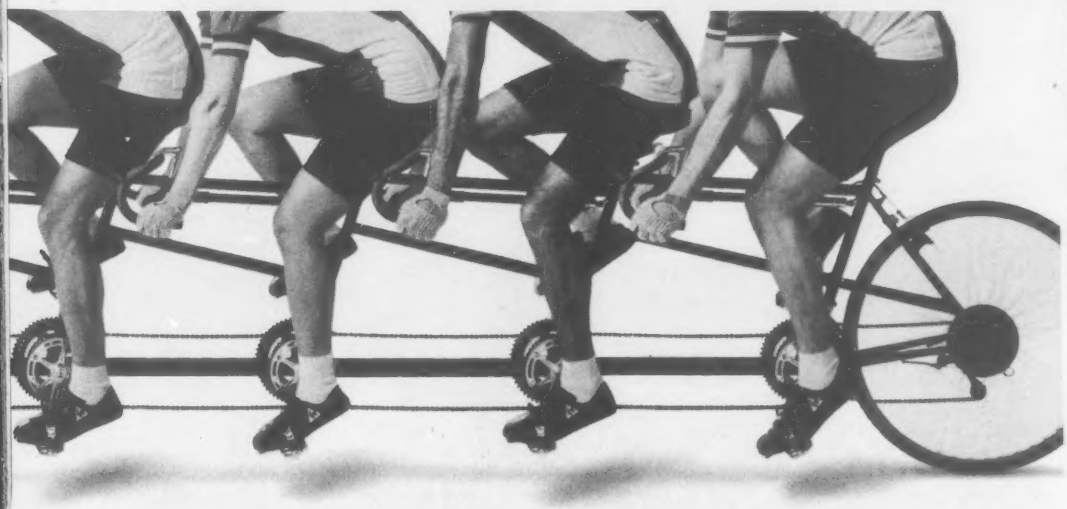
We have resisted calling this a crisis for the U.S. We could pursue a dark thought, imagining artificial intelligence technology to slip away out of our control, which would ultimately have severe effects on our industry, standard of living and national defense.

We prefer instead to regard this Japanese challenge as an opportunity for the U.S. to revitalize itself, to join the Japanese and other nations in the world in the exhilarating adventure of moving the Empire of Reason, as historian Henry Steele Commager could once, with justification, call the U.S., decisively into the Age of Reasoning Machines.

About the Authors

Edward A. Feigenbaum, professor of computer science at Stanford University, is one of the originators of the concept of knowledge-based systems — computers that use stored knowledge to make decisions that would normally be made by human experts. Feigenbaum has edited and coauthored several books, most recently The Handbook of Artificial Intelligence.

Pamela McCorduck is a New York-based writer who contributes articles on scientific topics to both specialized and popular magazines and teaches a workshop at Columbia University in writing about science. Her most recent book is a history of artificial intelligence, Machines Who Think.‡



has the fastest Unix-based systems.

All of which help boost performance even further. Giving your system enough stamina to run multi-user applications at full speed all day long.

Plus more standards as standard equipment.

There are times when performance isn't everything. There's growth, too.

That's why we've included the MULTIBUS® standard for board-level expansion.

Plenty of serial RS232C ports for terminals of all kinds.

And standard software packages like COBOL, Pascal, BASIC, and C. Plus access to hundreds of third party UNIX packages.

We're right behind you.

No one, but no one, supports UNIX and you as completely as we do.

You'll get full software engineering support, UNIX software maintenance, and even a software referral service for all your OEM programs.

Plus a field engineering force that can help you take the lead in your field, no matter what it is.

Want a race?

Come run a benchmark on one of our Plexus systems. To set one up, just call 408-988-1755, or write us at: Plexus, 2230 Martin Avenue, Santa Clara, CA 95050.

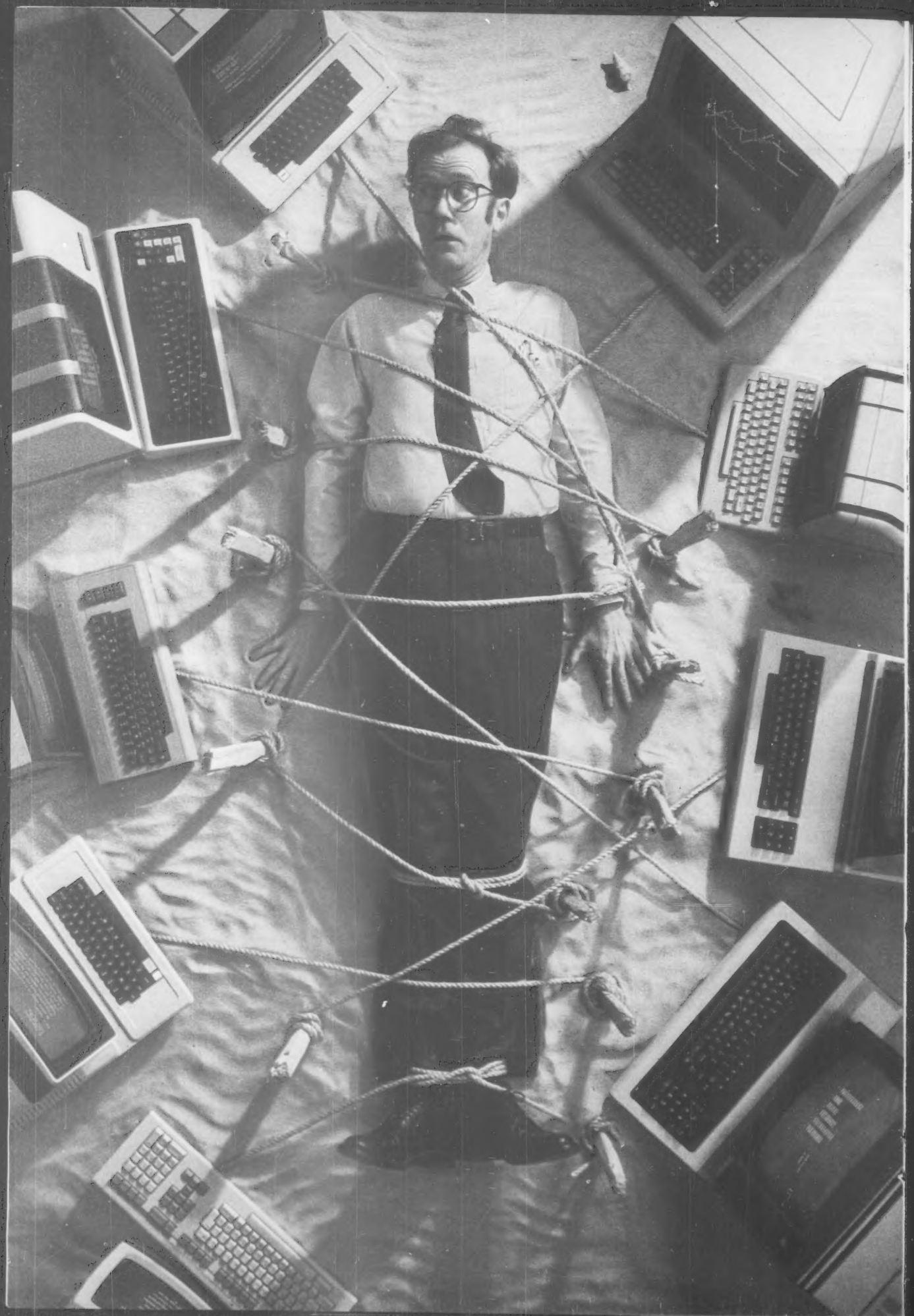
You'll see a performance feat no other commercial UNIX-based system can match. Which is understandable. We go so fast because we've got more going for us.

PLEXUS

Built for speed.

Don't miss the performance. See the Plexus systems and our OEM Software Showcase at NCC Booth S-5384 in the Convention Center.

VAX is a trademark of Digital Equipment Corporation. UNIX is a trademark of Bell Laboratories. MULTIBUS is a registered trademark of Intel Corporation.



Honeywell announces help for companies besieged by an army of personal computers.

"Overrun."
"Invaded."
"Swamped."

DP managers use a variety of terms to describe the arrival of so many different personal computers on the business scene. But the feeling is always the same.

After all, most managers have spent *years* developing well-controlled information systems. Now, almost overnight, they are losing control.

And while there's no arguing that PCs are valuable tools for individual productivity, everyone would prefer a more integrated approach for the company.

What's needed is a system that combines corporate data base capability with the personal computer capabilities employees now insist upon. A system with the capacity to extend the functionality of the corporate network to the individual local level. This is exactly what Honeywell has built.

The microSystem 6/10.

The cost-efficient microSystem 6/10 is a multi-personality workstation that provides an impressive range of functions – including networking.

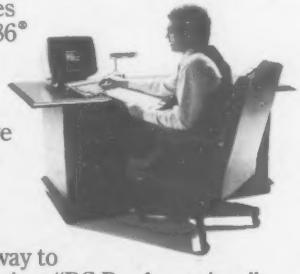
Besides personal computing, the system handles data processing and word processing. It can function as a network endpoint and a terminal emulator. What's more, power and flexibility make the microSystem 6/10 perfect for adaptation to industry-specific applications.

The microSystem 6/10 ensures organizational unity through excellent communications – it talks to IBM mainframes as readily as to our own.

It also offers expandable hardware and our time-proven GCOS operating system, which is compatible across the entire range of Honeywell minicomputer products, including even the most powerful 32-bit systems. This compatibility assures easy progress along your growth path by eliminating the need to recreate applications and retrain personnel.

Fight fire with fire.

Best of all, perhaps, the microSystem 6/10 will be an immediate hit with employees wed to their PCs. Because it accepts popular software packages based on CP/M-86® and MS/DOS,® chances are your people won't have to give up their favorite programs.



The microSystem 6/10.

Here's the way to win the battle against "PC Pandemonium." And the war for control.

For more information, call **800-343-6294** (within the 617 area, call 895-7572) or write to the Honeywell Inquiry Center, 200 Smith Street (MS 440), Waltham, Massachusetts 02154.

Together, we can find the answers.

Honeywell

Come and see the new microSystem 6/10 at NCC.

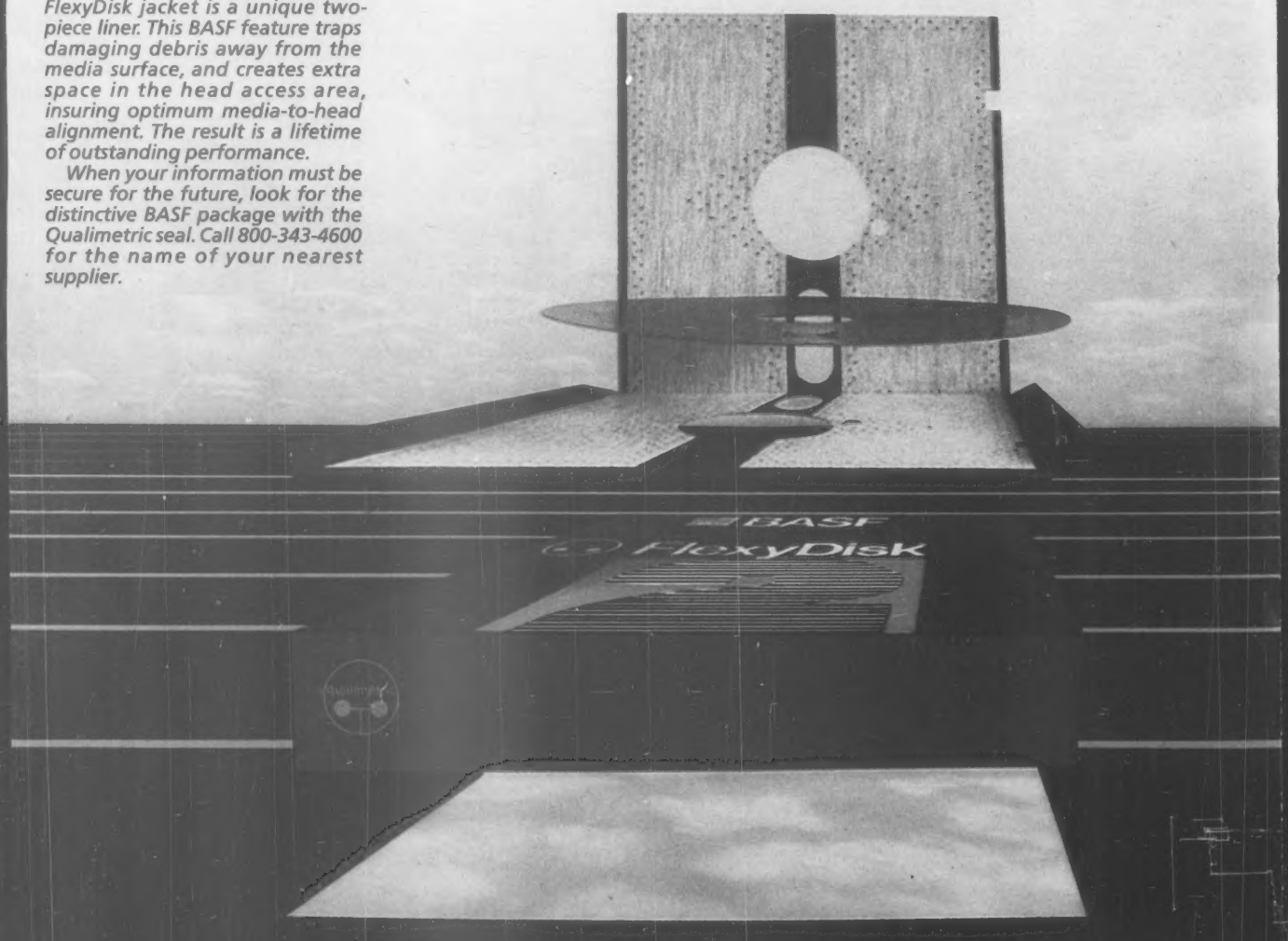
CP/M-86 is a registered trademark of Digital Research, Inc. MS/DOS is a registered trademark of Micro Soft, Inc.

BASF QUALIMETRIC™ FLEXYDISKS®
BUILT FOR ETERNITY - WARRANTED FOR A LIFETIME.

BASF Qualimetric FlexyDisks® offer you more...an extraordinary new lifetime warranty. The BASF Qualimetric standard is a dramatic new international standard of quality in magnetic media...insurance that your most vital information will be secure for tomorrow when you enter it on BASF FlexyDisks today.*

We can offer this warranty with complete confidence because the Qualimetric standard reflects a continuing BASF commitment to perfection...a process which begins with materials selection and inspection, and continues through coating, polishing, lubricating, testing, and 100% error-free certification. Built into our FlexyDisk jacket is a unique two-piece liner. This BASF feature traps damaging debris away from the media surface, and creates extra space in the head access area, insuring optimum media-to-head alignment. The result is a lifetime of outstanding performance.

When your information must be secure for the future, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.



ENTER TOMORROW ON BASF TODAY

BASF

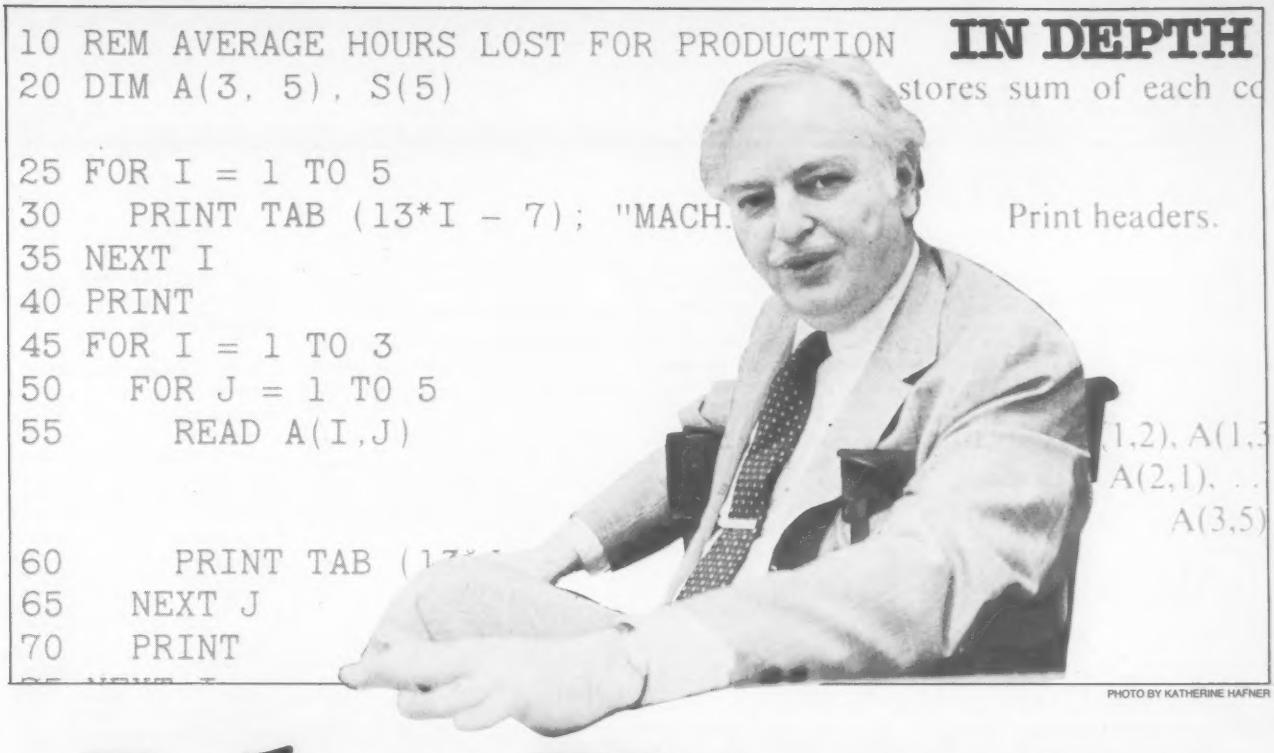

10 REM AVERAGE HOURS LOST FOR PRODUCTION
20 DIM A(3, 5), S(5)
stores sum of each co
25 FOR I = 1 TO 5
30 PRINT TAB (13*I - 7); "MACH.
Print headers.
35 NEXT I
40 PRINT
45 FOR I = 1 TO 3
50 FOR J = 1 TO 5
55 READ A(I,J)
(1,2), A(1,3
A(2,1), . .
A(3,5)
60 PRINT TAB (
65 NEXT J
70 PRINT

PHOTO BY KATHERINE HAFNER

John Kemeny

An Interview With The Originator of Basic

By Katherine Hafner

When John G. Kemeny logged onto his terminal on the first day of the month, three words greeted him: "Happy 19th Anniversary."

The message came from two computer operators who knew Kemeny would understand. Naturally, he did.

At 4 a.m. on May 1, 1964, the first time-sharing system went on-line concurrently with a new computer language called Basic. Both Basic and the time-sharing system were developed by two Dartmouth College mathematicians whose curiosity was stirred by the arrival of computers in their field.

Basic, of course, has evolved into one of the most widely used computer languages. And the Dartmouth time-sharing system redefined computers as universally accessible tools.

Leading the research on Basic was a Hungarian-born mathematics professor named John Kemeny.

As a teenager in 1940, Kemeny fled to the U.S. to escape the Nazi tide in Europe. He received his Ph.D. in 1949 from Princeton University, where he worked as a research assistant to Albert Einstein.

In 1953 Kemeny moved to Hanover, N.H., to teach at Dartmouth. In 1981 he resigned after 11 years as president of the small Ivy League school. The indefatigable Kemeny will remain a fixture on campus as a professor of mathematics, spending his days immersed in his first true love: teaching.

The American Federation of Information Processing Societies, Inc. is giving Kemeny its first education award at this week's National Computer Conference in Anaheim, Calif. The honor recognizes his "visionary efforts at making computing universal for students of all disciplines."

To the general public, Kemeny is perhaps best known for heading the Kemeny Commission, which investigated the 1979 accident at Three Mile Island.

Kemeny was interviewed earlier this month in his office tucked away in a corner of the college's Baker Library.

How did the development of the Basic language start?

Tom Kurtz [professor of mathematics at Dartmouth and co-developer of Basic] started the chain of events. He came to me in early 1963 and said, "Don't you think the time has come for liberal arts students to learn how to use a computer?" I said something like, "Yes, Tom, but I don't think it's physically possible." Then he said he had an idea on how to do it and he outlined what would become time-sharing. I was very quickly sold on it.

Wasn't Dartmouth's time-sharing system the first?

IN DEPTH

MIT started theirs before we did and finished about a year after we did. I usually tell people that's because they hired professionals and we hired undergraduates, so we finished first.

Basic was my idea. I said, look, as long as we're doing this, how about coming up with a language that would be a lot friendlier than the Fortran of those days, which was essentially all that was available. And that's a very different Fortran from today's Fortran because Basic has had a very big influence on Fortran. But there Tom was skeptical. He said, "That would be terrific, but what would be the use of our students learning a language that they couldn't use anywhere except at Dartmouth?"

He was convinced that IBM would dictate what language was used. And I had some worries about that, too, but I persuaded him it was worth doing anyway.

And that's how Basic came about.

How long did it take?

We operated on a very tight timetable. We started planning in the Spring of '63 with a National Science Foundation grant. The hard work all took place in 12 months; that included developing time-sharing and Basic and I myself wrote the first Basic compiler. The computer did not arrive until halfway through the year, so we had to beg borrowed time from other computers. But within 12 months we had both time-sharing and Basic working.

What was the reaction when it first came out?

The students just took to it like ducks to water. With my colleagues, (acceptance) was slower. A great many of them had to learn in self-defense, first in science courses, but later in other courses. They just couldn't let the students get that far ahead of them. Of course, that's an incredible amount of power to put at a student's fingertips. As far as the general success, it went way beyond anything we expected.

We had to develop it on GE machines. We had no connection to GE, but they had the right combination of equipment and one of the senior vice-presidents came up just to see what the heck we were doing. He thought it had real potential for GE, so they gave us a large machine, much larger than anything we could afford, in exchange for developing a large time-sharing system. Of course, GE sold out some years later to Honeywell, so our equipment is now Honeywell. One interesting thing is that when they sold that equipment, one thing they held onto was time-sharing services. It's a good example of cooperation between industry and education. We both gained greatly.

With the many different versions of Basic that exist today, do you see standardization as hopeless?

No. It's going to be hard, but something very important has just happened. A national committee to standardize Basic has been at work for about seven years. It's a broadly representative committee, not just educational institutions. Part of the problem is that too many people have a stake in Basic. I think it's the language, for example, that's run the most on personal computers. So there are all kinds of financial stakes. But the committee should issue its report this spring, so I hope by the end of the year there will be a standardization.

Do you think the variation hurts the language?

We weren't born yesterday.

That's why more than half of the companies in the Fortune 500 rely on software from UCC.

Reliability, persistence, experience — these are the elements of success in business and in software.

For a generation, industry leaders across the country have looked to UCC for a full range of business software:

- Financial Control System
- Credit and Accounts Receivable Management
- Accounts Payable
- Fixed Asset Management
- Tax Planning and Compliance

And UCC software is backed by one of the largest, most skilled, and most experienced service groups in the software industry.

We have been,
we are, and we will be
the right place to turn
for software solutions.

UCC
UNIVERSITY COMPUTING COMPANY

A full range of applications and systems software products.
For further information and an on-site visit, call 1-800-UCC-1234.

UCC Tower, Exchange Park, Dallas, Texas 75235
Dallas • Chicago • Toronto • London • Zurich • Paris • Dusseldorf
UCC is a subsidiary of Wyly Corporation (NYSE).

ORDER THE NEW 30 MIN. DIAL-A-SKILL KNOWLEDGE TESTS FROM WOLFE...
For Hiring or Training of Experienced Staff

- Structured COBOL
- DOS/VSE JCL
- MVS JCL
- TSO/SPF
- CICS
- IMS/DL-1
- VSAM
- IDMS/TOTAL
- Structured Analysis/Design

Call Toll Free or Write Immediately for No-Risk Trial
1-800-431-1953, Ext. 828
In N.Y. State only:
1-800-942-1953, Ext. 828
Wolfe Computer Aptitude Testing Ltd.
Box 319, Oradell, N.J. 07649

SATISFACTION GUARANTEED

Terribly. I think that's the biggest problem Basic has at the moment. There are actually two kinds of problems: One is that it's not standardized. The other one is that some of these implementations, particularly on micros, are very poor implementations, and that hurts because people think the Basic they're using is *the* Basic. I keep hearing people complain that you can't do so and so in Basic, when we have had it for a decade at Dartmouth and other places.

'Still, in government and business the overwhelming emphasis is on efficiency, and they do not understand that for very little extra money they could come up with much friendlier systems.'

Also, since that's the language most people know, it's an obvious language in which to have teaching materials available, but it's terribly hard to do that because if you're writing on one computer, it won't run on another. I hope that's what standardization will achieve.

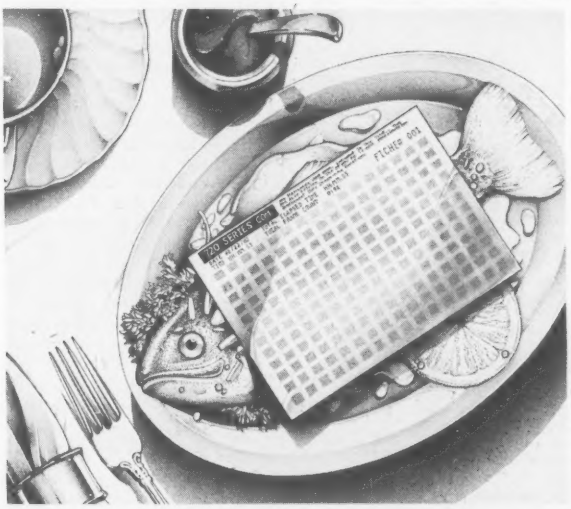
Did you foresee the pervasiveness of computers today?

Yes. At the dedication of our Kiewit Computation Center in 1966, I gave a speech that probably shook my audience more than any other I ever gave. I made a prediction that in 25 years, computers would be as common in the home as television sets were in 1966. I think a significant portion of the audience thought I was mad and, of course, with eight more years to go, I can easily make that prediction. Actually, I will be partly wrong because I only predicted that computer terminals would be that common in the home. I did not foresee the coming of personal computers.

In your 1972 book,* Man and the Computer, *you wrote that you would like to see a fundamental change in the attitude of business and government towards people and their relationship with computers. You said: "Both should be willing to spend more to make life better and easier for everyone." Has your hope materialized or is it more remote than ever?

I think some of both would be the answer, in that the coming of personal computers in a way has made it a great deal easier for people to have reasonably friendly access to computers. I still have no evidence that either business or the government has changed its attitude in any fundamental way. Still, in government and business the overwhelming emphasis is on efficiency and they do not understand that for very little extra money they could come up with much friendlier systems.

How could they make systems friendlier?



Now you can have fiche with everything on it.

Now virtually any computer-output application you use can be put onto microfiche.

With 3M's Series 720 COM Systems.

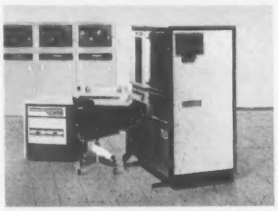
Systems that will hook right up to your computer-output. Providing an easy-access data bank. One that's so versatile, it allows you to create any number of output formats. Including electronic forms creation, multi-character fonts and sizes, and numerous titling capabilities. As well as everything from production work to SYSOUT. Without the need for host computer data handling and reformatting.

Fact is, 3M's Series 720 has the highest degree of input and output flexibility and versatility of any cut-fiche COM system available today.

What's more, the Series 720 COM speeds turnaround time with dry silver cut and processed fiche. It even offers the option of roll/scroll type processing for high volume production applications.

So whether you need an on-line COM, an off-line COM, or one that's switchable, the 3M Series 720 COM Systems are the ones that will give you your fiche. With everything on them.

3M's Series 720 COM Systems are supported by a sales and service organization throughout the world. For more information, call toll-free: in the U.S., 1-800-328-1684 (in Minnesota 1-800-792-1072) and in Canada, 1-800-268-9055 (operator 13). Or complete this coupon and mail it to us.



3M Series 720 works along with your computer.

I want to put everything on my fiche. Please send me more information on the 3M Series 720 COM Systems.

COW 5-16

Name

Title

Company

Phone ( )

Address

City

State/Zip

Send to: 3M COM Systems, P.O. Box 33050, St. Paul, MN 55133 Attn: G. Collins

3M hears you...

3M

MLC announces

The solution to learning VISICALC!* VIDEO TAPE.

Micro Learning Concepts solves your VISICALC training needs with its revolutionary new concept—personalized learning on video tape.

The VisiCalc Program has never been easier to learn. With LEARNING CONCEPT: THE VISICALC PROGRAM, you choose the time and place to fit your schedule.

Using the case-study method, the viewer learns Visicalc (on the IBM PC) by working with the video tape, building and modifying a spreadsheet step-by-step.

LEARNING CONCEPT: THE VISICALC PROGRAM also includes a Quick Reference Guide that contains reference charts and summaries of every command.

Whether you're a corporate manager, financial analyst, strategic planner, director of training, or even the CEO, LEARNING CONCEPT: THE VISICALC PROGRAM will solve your training needs. Send coupon to order or for more information.

MLC

The Learning Company

CORPORATE VOLUME DISCOUNTS AVAILABLE

*VisiCalc is a trademark of Visicorp.

LEARNING CONCEPT: THE VISICALC PROGRAM.

- The video tape first introduces the VisiCalc Program and the IBM PC.
- You learn to build spreadsheets, and use numerous commands like EDIT, FORMAT, PRINT, GLOBAL, STORAGE and WINDOW.
- You learn to use the VisiCalc Program for *your own* unique requirements.
- The *Quick Reference Guide* contains a summary of all the data necessary to master VisiCalc.

Coming Soon: Lotus 1-2-3!

Micro Learning Concepts, Inc.
120 East 56th Street, Suite 530
New York, N.Y. 10022 (212) 980-3552

☐ Have your sales representative contact me.

☐ Send me _____ LEARNING CONCEPT: THE VISICALC PROGRAM in the following VCR formats @ $129.95 each.

☐ Beta ☐ VHS ☐ U-Matic (add $30.00)

Please add $2.50 for postage and handling. Please enclose check or money order. N.Y. State residents add sales tax.

Name

Company

Address

City _____ State _____ Zip _____

Tel

IN DEPTH

By spending a little more money on the user interface and worrying less about whether they waste a little bit of computing time, let the computer do more of the work so human beings have to do less. Particularly, computing power has gotten to be so cheap that some of the early attitudes — all of us had them — of having to do things so terribly efficiently are not applicable.

You said in 1976 that as computer science develops, less and less advantage of the talents of human beings is being taken.

Do you still believe this is true?

Let me say that I at least don't see evidence that computer scientists deal with the problem as to what the division should be between human beings and computers. It is perfectly natural that computer scientists should figure out how computers can do more and more, but I think the problem of the right division of labor between humans and machines has not been addressed, at least not to my satisfaction.

How would it be addressed to your satisfaction?

By looking very hard at categories of tasks and trying to figure out either by thinking or by experimenting just what computers are good at and what human beings are good at. That has not been done to my satisfaction; I mean, I would think that it's a subject that you could write lots of papers on. I see articles on all sorts of things, but not on that. You see papers on how you could build a bit more creativity into your computer program but not a paper on how can human beings working together with a computer achieve more than either one of them could alone.

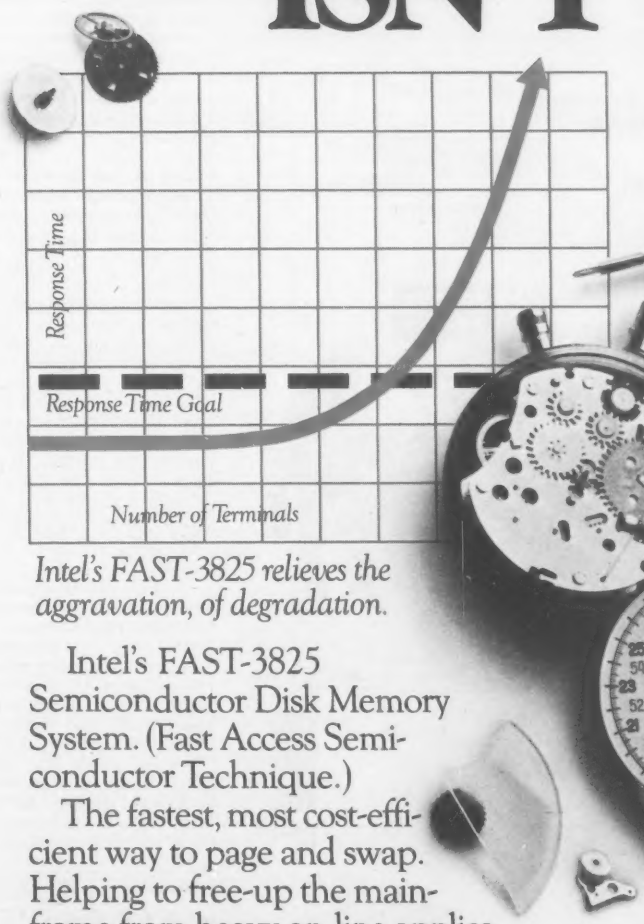
What's your assessment of CAI [computer-aided instruction] today?

I was never in favor of CAI. In fact, I vocally opposed it in the '60s, when some computer manufacturers came out and predicted that CAI would take over education completely. I don't believe computers will replace teachers. Also, some of the early CAI and some of the CAI today is terribly drab, so I tend to avoid the word, though there are some things that are technically CAI that I wouldn't quarrel with. If you want to drill a student in foreign language, vocabulary or grammar, a CAI program is fine. That's a routine drill. I think that's what CAI is good for. What I like to do is distinguish between that and the use of computers in education, which I am, of course, a very great believer in.

Suppose high school students have trouble with arithmetic in grade school. They often get hung up and they're afraid to tackle algebra, not to mention something as terrifying as trigonometry. In the age of computers, there's just no good reason for that at all. Let me take trigonometry; it's a good example. I try to think back on my trigonometry course in high school, and most of the time we spent in class was spent on

Stack the results in your favor with NEC modems.
Unsurpassed reliability. State-of-the-art technology. That's what you can count on with NEC modems —and for some very special reasons.
NEC is a major modem manufacturer. But we're also one of the world's leading, most diversified manufacturers of products that use modems. Telecommunications. Data communications. Computers. Facsimile, plus more. So we know from experience what works best.
NEC Central Research Laboratories constantly feed us dynamic new ideas and concepts, too, so we stay on the leading edge of modern technology. Our compact high-speed modems and auto-dial/auto-logon modem are the most advanced and economical of their type. And our broad product line includes total Bell System compatibility from 300 to 2400 bps.
NEC reliability comes from manufacturing most of our own components, including our own VLSI microcomputers. Combined with "Zero Defects" quality control, this helps our modems achieve a MTBF in excess of 9 years.
Our nationwide distributor network backs you with local support. And for direct technical assistance, we furnish a 24-hour toll-free number you can call.
Stack the results in your favor by contacting us at 1012 Stewart Drive, Sunnyvale, California 94086 (408) 737-7711, or (800) 538-8166.
Data Communications Products
NEC NEC America, Inc.
DATA MODEM 1800
DATA MODEM 1200
DATA MODEM 300
ORIGINATE OR ANSWER
DATA MODEM 1800
DATA MODEM 300/1200
AUTO DIAL AND LOG-ON
DATA MODEM 2400 M

IF YOUR SYSTEM IS SLOW, IT DEFINITELY ISN'T FAST.



Intel's FAST-3825 relieves the aggravation, of degradation.

Intel's FAST-3825 Semiconductor Disk Memory System. (Fast Access Semiconductor Technique.)

The fastest, most cost-efficient way to page and swap. Helping to free-up the mainframe from heavy on-line applications. So you can add even more users.

Allowing you to get the most out of your system. By maximizing the speed, capacity and investment of your CPU.

How fast is FAST? Typically, 20% faster than anything else. With a .4 msec access time. A 10-15% increase in system throughput. A 25-50% improvement in terminal response time. And a speed of 500 pages a second, at 3.0 to 4.Omb/second.

That's FAST.

But what makes FAST really good and fast is its flexible storage capacity. Up to 144mb. Plus that it's compatible with IBM, Burroughs, AMDAHL and NAS systems. And that FAST can be used with your present system and migrated to your next generation CPU.

Just a few more FAST thoughts. You'll be getting greater reliability, serviceability and lower cost of use. Because FAST has no moving parts. FAST is self-healing. Self-diagnostics find most problems before they can develop. Our service is fast, too. And being FAST doesn't mean you'll be wasting energy.

Because FAST requires only one-fourth the power and air conditioning of any other system. Even power outages won't slow you down, with an optional UPS backup.

Call us, toll-free. **(800) 538-1876.** In California, **(800) 672-1833.** Or write us. Lit. Dept. K-8, 3065 Bowers Avenue, Santa Clara, CA 95051.

If your system looks like it's starting to slow, you'd better do something FAST.

intel® delivers solutions

IN DEPTH

stuff that there's no sense in teaching human beings in the age of computers. For example, the only way you could find the value of a sine was to look it up in a table and then interpolate. It's absolutely madness to teach interpolation from a table. It's a useless art.

On the other hand, trigonometry is as important as it ever was and with the help of a computer you can teach vastly more. Here's where personal computers will help a great deal. I have tried to rethink what you can do with personal computers, because I think it's a very important topic. For example, one thing they have is very good graphics. There are all kinds of things a student can do sitting at the screen; they can see what the picture of the sine of 2x looks like as compared to the sine of x or whatever and they can play around and discover visually in a few minutes something that would otherwise be very abstract to them.

The single most important use of computers is, I believe, to use the program as the teaching tool. Understanding one program is much more important than understanding how it works. Even those of us who have taught math for years learn something about it when we first write the program.

How do you view the rush among college students today into computer science. Where does this leave liberal arts?

Let me differentiate between computer literacy and computer science. Tom Kurtz convinced me 20 years ago that it's absolutely essential for every liberal arts student to acquire computer literacy and today I would set a higher standard for computer literacy. The student should know what the computer does and should have written a number of programs so that they're not afraid to use a computer.

I feel differently about computer science. Computer science is one of 30 or so subjects taught in a liberal arts college as something you can specialize in. At the moment, with the way the job market is, probably too many students are rushing into it. Except for those who really want to devote their whole life to it, I would prefer that they major in something else and then take a substantial

FORMS DON'T COST. PEOPLE COST.

Comparatively speaking, that is. Pennies invested in forms design can save you dollars in the cost of people who use them (according to both industry and government sources). Curtis 1000 designs forms so they're easier to use, harder to make mistakes on, better at helping your people save time and increase productivity. Reduce your people cost by asking Curtis 1000 to design or redesign your business forms! And check our mile-long list of other products, too, such as envelopes, letterheads, business cards, and supplies for word and data processing. Products to help you get the word from person to person, department to department, company to customer. We supply things to make business work. We've been at it for over 100 years.

Curtis 1000

1000 DIFFERENT PRODUCTS TO MAKE BUSINESS WORK.

For samples, call your Curtis 1000 representative or write Curtis 1000 (CW-CF2B), 1000 Curtis Drive, Smyrna, GA 30080

THE COMPLETE BRANCH OFFICE

- Luxuriously furnished
- Prestigious address
- Completely staffed
- Short term agreement
- Fully equipped
- No capital investment

All included when you lease from OmniOffices.

Atlanta (404) 256-0009
Houston (713) 965-0060
Chicago (312) 843-2500
New York (212) 867-5750
Dallas (214) 233-6664
San Francisco (415) 391-8810
Denver (303) 770-1000
Washington, D.C. (703) 821-8950

Or write for brochure:
S. Wilson, Leasing Manager
OmniOffices, Inc.
5775-E Peachtree Dunwoody Rd., NE
Atlanta, GA 30342

OMNIOFFICES

amount of computer science.

With the pervasiveness of microcomputers and the availability of less expensive application packages, what do you see as the future for time-sharing?

I think the best of all possible worlds has not yet happened. It's obviously going to change the nature of time-sharing. The best of all possible solutions is to have lots of personal computers, but have them all tied into a time-sharing system. With personal computers, the power is there, and you can do a lot on your own, but what you're losing without time-sharing is the sharing of information, even the sharing of knowledge.

Take one of the earliest good applications of time-sharing: airline reservations. It seems that's likely to change with more personal computers at airports, and therefore some of the work will be done locally, but it's totally useless unless they're still tied into a time-sharing system. The division of work is going to shift. Instead of a terminal you have a personal computer with all sorts of things you can do locally; on the other hand, for example, they could transmit to the personal computer all the reservations you have for that day so you don't have to tap into wherever the main computer is, but periodically there has to be an exchange of information between the personal computer and the central computer.

What role did computers play in the Three Mile Island Accident?

The absence of computers played a role in the accident itself. I was horrified when we toured the plant and they took us into the control room, which is where all the problems happened. I'm afraid after 15 minutes, a reporter overheard me saying, "My God, this is 20 years out of date." I got terribly nasty letters from authorities asking how I could say a thing like that.

It turned out I was wrong. We later found a document written 10 years earlier by a high official of the Nuclear Regulatory Commission. In it he said the equipment was 20 years out of date. So I was wrong; it was 30 years out of date.

What it amounts to is that computers were essentially not used. The only real computer was an ancient little computer that was purely for logging. We really decided that some good inexpensive computers would have made all the difference.

Now that you nearly have one 25-year prediction behind you, what do you see for the next 25 years?

Let me stick my neck out and say I think the breakthroughs will not be in computers. Of course, they'll get smaller and cheaper, but in a way the biggest changes have already occurred. With ordinary computers, there's only so far you can go in size because you run into the speed-of-light limitation. The breakthroughs still to happen are in thinking up really good uses of computers. Applications have lagged way behind the abilities of computers. There's a large supply of mediocre programmers, there are very few good systems designers and very few really first-rate software systems. It is ridiculous that with the number of professional programmers who work for all kinds of computer companies, amateurs still seem to come up with software none of them have thought about. You read a story every month about someone making millions with some incredible software; they deserve it.

The interviewer, Katherine Hafner, is a Computerworld *staff writer.*

CRT CABLES
SAVE UP TO 50%

• Fast Service • Guaranteed Products •

Belden 9207 Twinaxial for
SYS/34-38, 5520, 5260, 5280

Belden 9269 Coax for
303X, 4331, 8100, 370, SYS/3

ALSO - Teflon Air Plenum Cable, Lightning Protectors, Switch Boxes, Wall Plates, RS232C Assemblies, all of Belden's Cable Products Available.

Cord Cable Company

1704 - 3rd Ave. S.E.
Rochester, MN 55901
1-800-533-1576 or 507-282-7252

This Control Concepts 3270 compatible terminal keeps Rand McNally-TDM moving in the fast lane.

When Rand McNally-TDM sells their state-of-the-art MILEMAKER® software product to major freight carriers and shippers, they recommend a Control Concepts 3270 compatible terminal. Because they know that our integrated, direct connect modem allows you to get our terminal and their program up and running fast. It's important to Rand McNally-TDM to get new clients on line quickly and they know we can deliver in 72 hours. But just as important is staying on line. Should a problem arise, it can usually be resolved with just a telephone call.

There's another reason Rand McNally-TDM doesn't hesitate to recommend our product; it's the least expensive 3270 compatible terminal on the market.

Whatever *your* 3270 compatible requirements might be, talk to a Control Concepts Applications Engineer at 800/368-3078 (in Virginia, 703/631-0435, in California, 714/235-6721). He'll put you in the right lane.

CONTROL CONCEPTS
A DIVISION OF PRESEARCH INCORPORATED

2361 S. Jefferson Davis Highway, Arlington, Va. 22202

I'd like to start moving in the right direction. Please send me your brochure on the
☐ SNA/SDLC CC-3276
☐ BISYNC EM-3275/6
☐ I'd like a demonstration. Please have your nearest sales representative call me for an appointment.

Name Title
Company
Street
City State Zip
Telephone

©Control Concepts 1982

REDUCE APPLICATION BACKLOG.

ENHANCE PRODUCTIVITY.

STRETCH YOUR DP RESOURCES.

Read Computerworld's Special Report on Software Productivity Packages on June 27th.

Reduce application backlog. Enhance productivity. Stretch your DP resources. Read Computerworld's Special Report on Software Productivity Packages on June 27th.

You'll get a complete report designed to fill you in on systems software packages: Systems, teleprocessing monitors, capacity management/performance measurement tools. And, on utility packages: Debugging aids, application generators, sorts, query languages and report writers.

In addition, you'll get coverage of software products other than applications software packages that are *used by programmers rather than by end users.* These will include decision support systems, fourth generation languages and application development systems.

We're going to wrap software productivity packages up for you with application stories and case studies that describe actual end user experiences with these products. And you'll get non-product-specific tutorials that describe new concepts and ideas regarding software productivity packages.

Why is *Computerworld* devoting so much energy and coverage to these packages? Because you're gobbling them up as fast as they're developed. Because this segment of the software marketplace is growing at an incredible rate of 34% per year. And because these products are helping thousands of DP professionals

to reduce application backlog and to design and tailor applications that enhance productivity.

You'll get stories specifically designed to help you buy and plan better, like:

"How do you determine what kind of programmer productivity aids you need?"

"When do you know when you need a programmer productivity package?"

"Trends in mainframe operating systems."

"What role does DP play in a company's use of a decision support system?"

"How do programmer productivity packages affect overhead and CPU resource utilization?"

For these and many more stories designed to ask — and then answer — all your questions, just turn to your June 27th copy of *Computerworld's* Special Report on Software Productivity Packages.

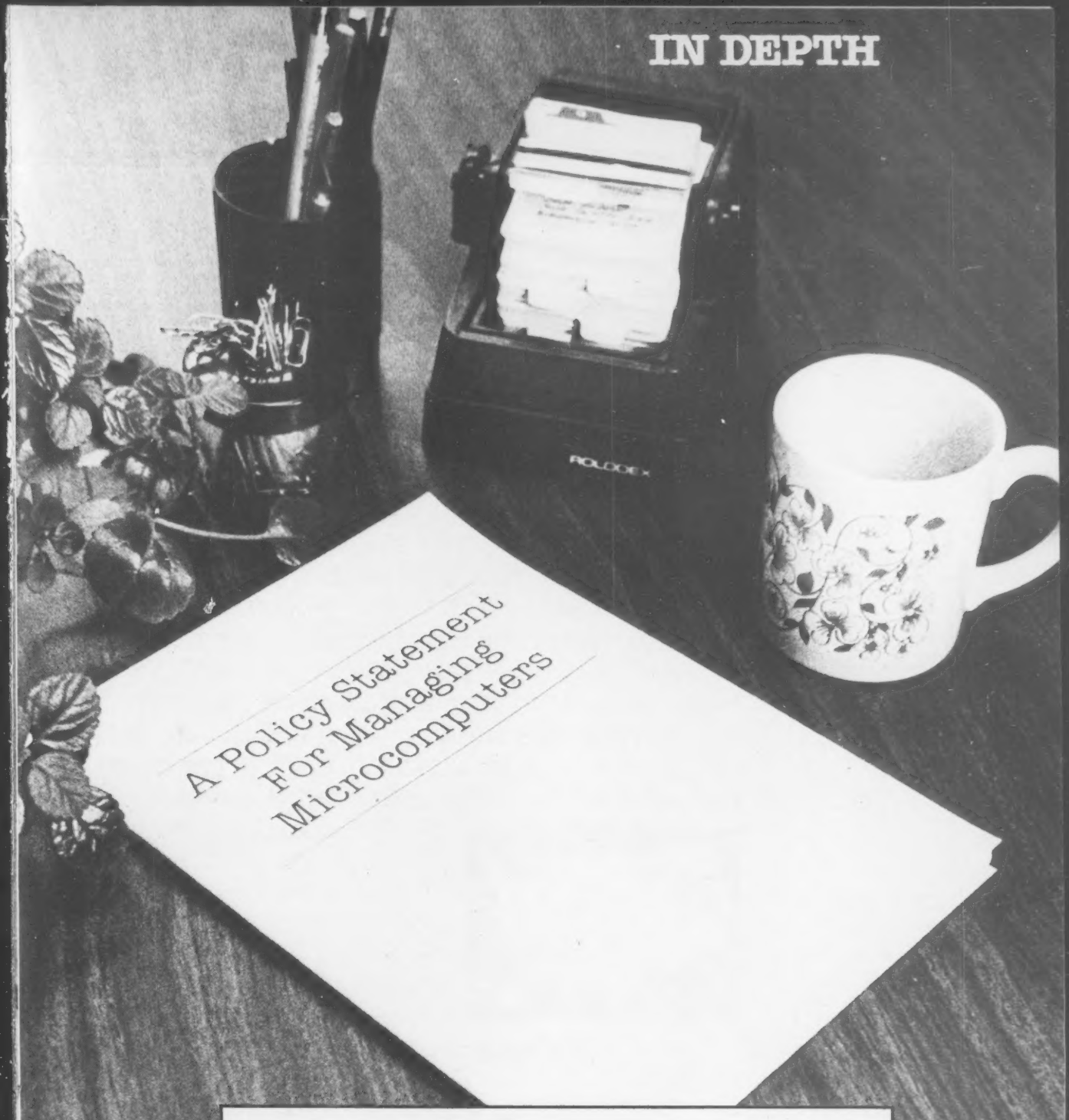
And if you *sell* software productivity packages to professional DPers or to end users, you won't find a better place to reach your customers. They'll be reading this Special Report. Ad deadline is June 10th, and your *Computerworld* salesperson can give you all the details. Or, to be sure and get your ad included, just call Don Fagan, Vice President, Sales at (617) 879-0700.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SALES OFFICES

BOSTON/Chris Lee, Ed Marecki, Joe Fitzhugh, Jim McClure, Kathy Doyle, Diane Sukey, *(617) 879-0700*
CHICAGO/Art Kossack, Newt Barrett, Chris Lee, Jean Broderick, *(312) 827-4433*
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*
ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*
SAN FRANCISCO/Bill Healey, Barry Milione, Theodora Franson, A.G. Germano, Eileen Dunn, *(415) 421-7330*
LOS ANGELES/Jim Richardson, Bob Hubbard, Beverly Raus, *(714) 556-6480*



A Policy Statement For Managing Microcomputers

By Peter G.W. Keen

How can organizations achieve the productivity benefits of microcomputers without threatening the integrity of the corporate data resource or creating duplication, inefficiency and waste?

The generic policy statement presented here balances local autonomy and central integration in managing micros in the workplace. The statement can be applied generally even though each company works according to specific constraints and needs.

The word "control" does not appear. The moment centralized DP publishes anything about controlling micros, users substitute the word "preventing." They see "controlling" as yet another plan by DP to protect its traditional territory.

Nevertheless, there must be a policy. Too often authority and accountability in the overall application of

PHOTO BY KATHLEEN GOW

information technology are no more than implicit in the areas of microcomputers, office automation, development priorities and distributed processing.

Policy basically involves defining mandates and directives: *who* decides, rather than *what* is to be decided, and who has responsibility.

The Policy Statement

1. The general philosophy is to encourage cost-effective applications of microcomputers; allow end users every opportunity to acquire hardware and software; and coordinate the recommended software and hardware with education, consulting support and sharing of experience and applications.

It is also essential to establish procedures for acquiring micro tools and to assign clear responsibility for auditability, security and, where relevant, maintenance.

2. Each major business and/or DP unit will appoint a coordinator for micros. The coordinator must have some prior (but it need be only limited) experience with micros as a user or builder of systems.

3. The coordinator will identify up to three recommended hardware configurations. These may be from different vendors, but each machine chosen must have communications capability so that it can be used as an intelligent terminal and access data from the company's mainframes. The coordinator must ensure that maintenance and technical support will be easily available to all user locations and should also set up, where possible, arrangements for quantity discounts, maintenance, leases or anything else that can reduce the cost to the company without increasing risk or decreasing benefits.

4. The coordinator will prepare a list of recommended software, which must be proven and reliable, require minimal technical support, be easy to learn and use and offer clear productivity opportunities for the company's business units.

The recommended software list will define a software spectrum, including low-end and advanced packages. The spectrum provides users with options for a given type of application. (The box on In Depth/39 shows a sample software spectrum for the Apple II.)

The coordinator must become thoroughly familiar with the software on the list and be ready to answer users' questions about it.

5. Users who wish to acquire software and hardware must register their requests with the coordinator. Each request should indicate the expected applications and identify potential benefits. These should be discussed with managers in the user department. Users are asked to quantify the economic value of the benefits even if they can provide only subjective estimates. The purpose here is to ensure that both costs and benefits are reasonably thought through. However, no formal return on investment, payback or cost/benefit analysis is required.

Users are urged to:

- Select hardware from the recommended list: The coordinator will provide assistance in locating supplies and resolving any maintenance problems only for hardware on the list.
- Select software from the soft-

Custom View Binders for software documentation plus diskette storage

Also available, fully customized in many styles, sizes and colors with imprinting and index tabs.

For more information, or the sales representative in your area, call toll-free 800-343-8820.

M+F Case Co.
PO Box 520, Pawtucket, RI 02860

INTRODUCING NETWORKING MODEMS. BECAUSE IF YOU HAVE DIFFERENT KINDS OF COMPUTERS WORKING FOR YOU, YOU NEED A DIFFERENT KIND OF MODEM. The MICROCOM™ Series RX/1000 and PCS/2000 Networking Modems are the only 1200 baud modems that let you create a network to transfer files between all types and brands of computers. Error-free.

Transfer files anywhere – over ordinary phone lines.

Now you can network micros, minis, terminals and mainframes – all without customized protocols or software.

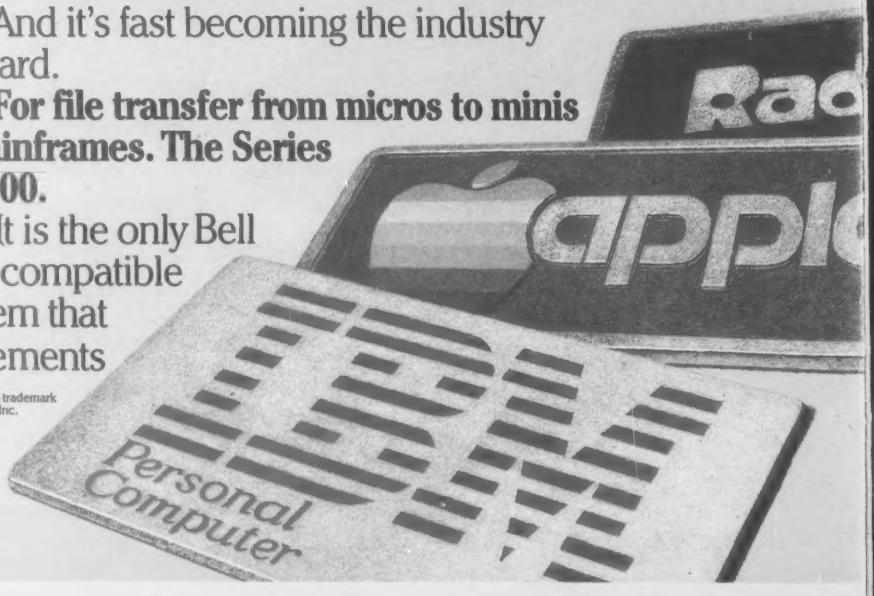
Our integral MICROCOM Networking Protocol performs complex networking tasks like speed matching and flow control. With its SDLC-like framing it provides data transparency, and error detection and retransmission.

And it's fast becoming the industry standard.

For file transfer from micros to minis or mainframes. The Series RX/1000.

It is the only Bell 212A compatible modem that implements

MICROCOM is a trademark of MICROCOM, Inc.



A MICRO POLICY

IN DEPTH

ware spectrum. The coordinator will provide training material and limited consulting advice for these.

- Have the coordinator evaluate packages not on the recommend list.
- Avoid programming. The policy is to use end-user packages and languages. Users are totally responsible for maintaining any applications they develop. Under no circumstances will resources be diverted from DP to deal with programming problems, errors or maintenance.

'The micro is here to stay. No rearguard action by DP can or should obstruct the first real contribution of computer technology to the everyday demands of managers, professionals and staff.'

Users are reminded that software engineering can be difficult, risky and expensive. It requires professional expertise.

The frequent turnover of qualified technical staff may leave them with a substantial maintenance problem.

6. Users are responsible for obtaining approval for acquisitions from their own management. The coordinator has no authority to reject any request.

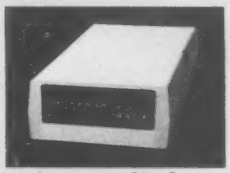
7. Further user responsibilities include the following:

- Compliance with all legal and audit requirements.
- Security of hardware, software and data.
- Data integrity. No user application may update a data base created or stored on a remote machine. If such a capability is justified, it must be provided by a centralized organization such as DP.
- Report integrity. Any report generated by an end-user package must be clearly identified with the label "Micro Report" so that it is not mistaken for an official report generated as part of the company's formal management information services (MIS) function. In situations where a micro report has basically the same format as an MIS report, the user must make sure the two cannot be confused.
- Ethics. Piracy is a growing problem for software vendors. Users are responsible for ensuring that the spirit and letter of the laws of copyright and trademark protection are followed to protect both the individual and the corporation.

8. The coordinator functions as a "gatekeeper" responsible for:

- Assisting users in the following areas of acquisition and application (only for hardware and software on the recommended list): purchasing, maintenance and troubleshooting; basic training for users and builders.
- Identifying and evaluating new software and hardware and adding items to the recommended lists.
- Identifying completed applications that may be of value to other users. A major part of the coordinator's role is to disseminate informa-

the MICROCOM Networking Protocol. That means you get error-free transmission between any two computers.



Other features: auto answer/auto dial, nine stored phone numbers, up to 9600 baud input, automatic flow control and buffering, and more—all for $895.

For unattended file transfer from micros to micros. The Series PCS/2000.

It does everything the Series RX/1000 does and more. With its integral clock and 32K file buffer it will send or receive files whether your computer is on, off, or doing something else. And this one's just $995.

So if you want to create a network, get the modems created for networks.

For more information about MICROCOM's Networking Modems, mail coupon to MICROCOM, 1400A Providence Highway, Norwood, MA 02062. Or call Harry Segal, Vice President of Sales, at 617-762-9310.

NAME _____ PHONE _____

COMPANY _____

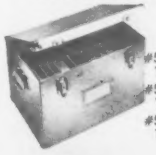
ADDRESS _____

CITY _____ STATE _____ ZIP _____ CW516

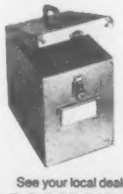
MICROCOM

The communications standard for micros.

ALUMINUM
MAG TAPE REEL CASES
ships up to 18 reels in strong lightweight case



#5125 1 to 10 Canisters
#5126 1 to 14 Thinline
#5127 1 to 18 Tapeseal



#5110 1 to 5 Canisters
#5115 1 to 7 Thinline
#5120 1 to 9 Tapeseal

See your local dealer, or call/write –
ALUMINUM CASE CO.
DIVISION OF BY-LO MFG., INC.
3333 W. 48th PL.
CHICAGO 60632 (312) 247-4611

tion and provide basic education and support, such as a standard half-day or one-day seminar on software, hardware and/or applications.

Basic Rationale

This policy statement should answer most questions from users, DP, senior managers and skeptical bystanders. The core issue is incentives. The micro is here to stay. No rearguard action by DP can or should obstruct the first real contribution of computer technology to the everyday demands of managers, professionals and staff.

DP needs incentives to respond to the accelerating interest in exploiting micros as a low-risk, high-yield investment in productivity.

Users need incentives to cooperate with DP, which is, in effect, the guardian of the computer information resource. Up to now, that resource has mainly been an aggregation of transaction processing, ill-structured files and inaccessible machines. DP is rapidly creating flexible capability in which terminals provide access via data communications to a range of services and products.

DP is also building an integrated delivery vehicle and information base that is more and more relevant to all levels and functions of the business. If users fiddle around, diverting funds and efforts and spreading incompatible machines, undocumented systems and inconsistent and redundant data bases, DP will at some point have to pick up the pieces.

Why a Coordinator?

The need for a coordinating role is clear. The software and hardware markets are changing rapidly and the current channels of distribution are poorly suited to meeting the needs of corporations. Retail computer stores focus on the consumer and their staffs generally have limited understanding of the product.

One salesman in a store specializing in sales to small businesses was asked, "How do you demonstrate software?"

"We really don't," he answered. "We let the machine do the selling."

Retail stores focus their effort on the low end of the market. There is an immense gap at the moment between corporate demands and retail supply channels. It is hard for companies to locate good software. Some central gatekeeper in the organization is essential to act as a focal point, a purchasing agent and a researcher.

The policy statement requires the coordinator to select up to three recommended machines, each capable of communications. Companies must find a mid-point between the two unattractive extremes of allowing incompatible machines to proliferate and trying to impose a simple machine standard on users. A likely selection of machines will be:

- The Apple Computer, Inc. Apple II or Radio Shack TRS-80 for their supply of end-user software and because they have strong loyalty among professionals and software developers.
- A Digital Research, Inc. CP/M-based machine, since this is now the *de facto* software standard.
- A personal computer manufactured by a mainframe vendor (for example, the IBM Personal Computer or the Digital Equipment Corp. Professional). The IBM Personal Computer will surely become a Systems Network Architecture terminal and thus an integral component of many companies' distributed processing capability.

few, since several vendors have recently launched attractive new products and other 16-bit micros will appear within a few months. On the other hand, companies must tackle the issue of proliferation now.

A key requirement in the policy statement is for communications capability. This need is based on the widely held assumption that the world is converging on the multifunction workstation and that the stand-alone micro is just one starting point; by augmenting it with communications, it becomes an intelligent terminal. In that situation, the needs of both end users and DP are satisfied. The distributed micro can be used in stand-alone mode with zero operating cost, in communications mode for access to a data re-

Scientific Computing Professionals:

Our success is built on our technical strength. So is yours, at Sohio.

Sohio is combining talented and creative minds with advanced technology to reinforce our position as one of the nation's leading producers of domestic crude oil. In San Francisco and Dallas, our Scientific Systems Divisions seek a variety of scientific computing professionals including Systems Engineers, Systems Analysts, Applications Programmers and Geophysical Software Professionals to provide vital support to our exploration and production efforts.

Your search leads to Sohio.

At Sohio, you will have the resources to make your ideas pay off. Our facilities, including new data centers, put the most advanced data processing technologies at your disposal. Starting with CDC Cyber 740 and Cyber 760 dual mainframes, and DEC, VAX, and PDP-11 computers, we are building an integrated network of distributed resources ranging from personal computers to vector super computers. You'll have every opportunity to contribute to our success, and to yours.

Sohio's search for technical talent is an integral part of our expansion plans. Experienced individuals should respond by forwarding their resume.

Judy Alter; Sohio Petroleum Co.;
S8101; 100 Pine Street;
San Francisco, CA 94111.

Dan Allman; Sohio Petroleum Co.;
Geophysical Data Center;
S8101A; One Lincoln Centre;
5400 LBJ Freeway;
Suite 1200/LB 25;
Dallas, TX 75240.

Equal Opportunity Employer, m/f/h/v.

SOHIO

Your search leads to Sohio.

EXAMPLES OF THE SOFTWARE SPECTRUM
(Apple II Only)

Application/Level	Low-end	Advanced
Budgeting and financial planning	Visicalc (Supercalc)	DSS/F
Data management and inquiry	DBMaster Dbase II	Micro Seed, NPL
Reporting and analysis	DBMaster Dbase II	DSS/A, Visi Series
Graphics	Apple Business Graphics II Visiplot	Apple Business Graphics II
Management presentations	Image Maker Executive Briefing Session	Image Maker Executive Briefing Session

source and in intelligent-terminal mode as a workstation in a distributed system.

Development Strategy

The software spectrum is the base for a development strategy. Micros are, above all, an end-user concept. It makes absolutely no sense to encourage the growth of amateur DP shops or to divert resources from DP. There is room for small ad hoc (Basic) programs, but the main aim should be to provide a range of first-rate nonprocedural tools with which people who know the application area well can develop systems both small and large.

By providing low-end and advanced tools, the coordinator can give every incentive for end users to move in this direction. He is saying, in effect: "Look, if you want a quick, simple project analysis system, have your secretary spend an hour a week typing in figures and use Visicalc. Later on, you may want to use DSS/F, which is much more powerful."

Or, he might advise: "You can do this with Visicalc, but it's very likely you'll want to create some more complex reports. Try DSS/A."

It is absolutely vital that whatever software the coordinator adds to the recommended list be proven. That list is in itself a safeguard against users getting into trouble and needing expert help, having to abandon projects or finding it difficult to maintain the systems they develop. Instead of trying to control the users, the policy statement aims at steering them toward first-rate, low-risk, reliable, cost-effective tools.

The coordinator's distinctive contribution to the organization — the effective use of advanced tools — lies in the development of the software spectrum. Being explicitly responsible for providing basic support (answering reasonable questions) for the software on the recommended list gives him plenty of incentive to evaluate potential additions thoroughly.

The most contentious aspect of the policy statement is the acquisition request. This point puts authority solidly with the user and leaves the coordinators (and DP) with no veto. The requirement that users be responsible for auditability, maintenance, security, data integrity, report integrity and ethics provides necessary bounds on user freedom. The business justification is really an issue for user management. By requiring users to obtain their own budget instead of being funded centrally the issue of benefit analysis and accountability for results is placed firmly where it belongs — with the user.

About the Author

Peter G.W. Keen is chairman of Micro Mainframe, Inc. in Cambridge, Mass. He is coauthor, with Michael Scott Morton, of Decision Support Systems: An Organizational Perspective.

Keen acts as managing editor for two publications — "International Journal of the Human Side of Office Technology" and "Office: Technology and People." He will be keynote speaker at the Microcomputers and Organizational Productivity conference sponsored June 7-8 in Boston by Micro Mainframe.

WANTED:

At our San Francisco Data Processing Headquarters, we want **EXPERIENCED**

- **Project Managers** CICS development
- **Database Analysts** Relational Database (ENSCRIBE preferred)
- **Senior Programmer Analysts** CICS or Tandem
- **Telecommunications Consultants** Network design and planning

REWARDS:

We are offering excellent career opportunities in a professional environment which includes:

- State-of-the-art IBM and TANDEM hardware
- Excellent development tools
- Progressive training and advancement
- Attractive compensation and benefits

For confidential consideration, please send your resume and salary history to: **Wells Fargo Bank, Operations Group Personnel AU784, 525 Market Street, San Francisco, California 94163.**
Equal opportunity employer m/f/d.

WELLS FARGO BANK

SINCE 1852

DIABLO 630 API IN STOCK NOW!

ALL PURPOSE INTERFACE MODEL—FOR IBM P/C™, Rainbow™P/C, Apple™II, TRS™-80, Centronics™703, Commodore™IEEE

- True letter quality 40 CPS
- 100-2400 Baud, switch selectable
- Vector Plotting capacity
- Metal/plastic print wheels
- Advanced Word Processing: right margin justification true proportional spacing underscoring
  BOLD
  centering
  line edit
- Sheet Feeder options: single, double, double w. envelope

630API

One, Two and Three year leasing options
On-site maintenance available
Other Diablo products in stock:

- 630 KSR, 9600 baud
- 630 R/O ECS w. 192 char. wheel
- 630 R/O ECS IBM w. 256 char. wheel
- 620 R/O SPI 25CPS

Registered Trademarks of: International Business Machines, Digital Equipment, Corp., Apple Computer, Inc., Tandy Corp., Centronics Printers and Commodore Computers.

Diablo Authorized Distributor

For further information, prices and availability, call any National Computer sales office:

Atlanta	404-634-9330	**Chicago**	312-296-0830
Boston	617-444-6822	**New Jersey**	201-843-3800
Cincinnati	513-563-2500	**New York**	212-354-9866
Stamford	203-357-0004	**Philadelphia**	609-665-6240

NATIONAL COMPUTER Communications Corp.
HOME OFFICE
Box 602, 260 West Ave., Stamford, CT 06904
CALL 800-243-9006
in CT 357-0004

Computer OEMs: Now's the time to team with Altos.

As an OEM, you're aware there's a lot of 16-bit computers on the market. But what you may not be aware of are the many advantages to doing business with ALTOS® Computer Systems. Here's just a few:

- ☑ Altos currently offers the broadest range of cost-effective, single and multi-user 8086- and 68000-based computer systems.
- ☑ Altos supports the most popular commercial operating systems (XENIX™/UNIX,™ MP/M-86,™ MS™-DOS, OASIS-16, PICK, RM/COS,™ and UNIX System III™) plus most high-level languages.
- ☑ Altos microcomputers can run more existing applications software than any other computer in the world.
- ☑ Altos offers a large selection of utilities and compilers for converting existing Z80™ and minicomputer applications, such as those written in DEC's® DIBOL.™
- ☑ Altos provides full communications support; both local networking and remote communications.
- ☑ Altos provides the widest range of 5¼" and 8" storage options, including floppy, Winchester disk and mag tape backup.
- ☑ Since 1977, Altos has delivered more than 35,000 multi-user systems and peripherals to satisfied customers throughout the world.

See us at NCC Show, Booth #W-6218.

- ☑ Altos backs its computers with responsive, worldwide service and support. (Customer Service Division of TRW, Inc. in the U.S.)

If you're an OEM looking to remain on top, now's the time to team with Altos. Call, write or clip the coupon today.

- ☐ Please send me more information on Altos' single and multi-user 8086- and 68000-based computer systems.
- ☐ My application is _____
- ☐ Please have an Altos representative contact me.

Name _____ Title _____
Company _____
Address _____
City/State/Zip _____
Phone (_____) _____ CW-5

Mail to: Altos Computer Systems, Attn: Marketing Services, 2641 Orchard Park Way, San Jose, CA 95134, Telex 470642 ALTO UI

800-538-7872 (In Calif., 800-662-6265)

ALTOS
COMPUTER SYSTEMS

Packed with more value for OEMs

ALTOS is a registered trademark of Altos Computer Systems. 8086 is a product of Intel Corporation. 68000 is a product of Motorola, Inc. Z80 is a trademark and product of Zilog, Inc. XENIX and MS are trademarks of Microsoft Corporation. XENIX is a microcomputer implementation of the UNIX operating system. UNIX is a trademark of Bell Laboratories. RM/COS is a trademark of Ryan-McFarland, Inc. MP/M-86 is a trademark of Digital Research, Inc. OASIS-16 is a product of Phase One Systems, Inc. PICK is a product of Pick & Associates and Pick Computer Works. DEC is a registered trademark and DIBOL is a trademark of Digital Equipment Corporation. UNIX System III is a trademark of Western Electric.

©1983 Altos Computer Systems

Software

. . . a handmade commodity designed in an ad hoc manner with few standards, a product that is almost always late, poorly documented and difficult to maintain.

The Maintenance Challenge

By Paul Bassett and Scott Rankine

Maintenance holds the software industry captive, strangling productivity and tying up vital programming resources. Programmers and analysts spend far more time adapting and maintaining programs than they do writing them. Maintenance accounts for a dizzying 50% to 70% of total software expenditures. While hardware costs have plummeted, the cost of producing programs has skyrocketed, ranging up to and beyond $200 per line of finished code.

In spite of their "gold plating," many commercial applications contain embarrassing and occasionally crippling errors. This situation occurs largely because software remains a handmade commodity designed in an ad hoc manner with few standards, a product that is almost always late, poorly documented and difficult to maintain.

Maintenance covers an enormous range of activities, including corrections to code, repairing design flaws, modifying documentation and test data, upgrading capabilities and user support.

Many activities labeled maintenance are actually enhancements. In the strictest sense, maintenance means to restore something to its original condition. Unlike machinery, however, software does not wear out.

Enhancing software is necessary for a variety of reasons, including changing user needs, environments, operating systems and procedures. Maintenance is also an inexact science. Debugging an operational program can never reveal the absence of errors, only their presence. As a result, putting the final polish on a program and

IN DEPTH

ensuring that it is relatively error-free is the most time-consuming phase of the development cycle.

Life-cycle maintenance costs are high, often exceeding the development or purchase costs of the application itself. This fact tends to be glossed over by software vendors, who often choose to ignore the high costs of supporting applications in order not to scare off prospects.

Generally speaking, most programmers regard maintenance as low-level drudgery. Having developed an application, many DP professionals spend years locked into maintaining it. Boredom eventually sets in, contributing to employee turnover with the subsequent loss of vital expertise crucial to maintaining the application.

Slow Death

Ironically, software "ages" and eventually "dies" from the cumulative effect of maintenance activities. Over time, the structure or integrity of a program, controls, test data and documentation degenerates as a result of mostly minor and unconnected changes.

Minor modifications first appeared cost-effective because they required less effort to perform than a major system overhaul. But in the end, repeated surgery causes the application to bleed slowly to death. It eventually takes more effort to maintain the application than to rewrite it, and the old system is laid to rest.

However, it is not the nature of software that is to blame, but current programming practices and the tools that support them. A brief analysis illustrates this point.

Current Methodologies

In the commercial software environment, there is often considerable functional overlap between programs. File maintenance is a good example. Among file maintenance programs, it is mostly the names of the files and the fields to be maintained that vary. The logic of opening a file, reading records, querying the user about what he wants to do, adding, changing and deleting records is quite common to such programs.

Programmers faced with the task of creating a new file maintenance program — or any other application, for that matter — usually begin by trying to reuse code segments from existing programs that in some respect satisfy their current needs.

Through a process of cutting and pasting, the old code is modified and then combined with the programmer's own custom code to produce a working program. Considering the effort that went into developing and debugging the old code, this process appears to give the programmer significant productivity leverage.

However, once the process is completed, both the old and new programs must be maintained as completely independent entities despite the considerable common functionality. After cutting and pasting, both old and new code are invisibly intertwined, making them difficult to modify because of other hidden and subtle interactions.

Bigger Headaches

Altering code that is common to several programs presents even greater maintenance headaches. Any changes, no matter how slight, must be manually introduced into each of the programs because there is no easy or automatic way of guaranteeing that the changes will interface with the different programs. Thus, the potential maintenance labor savings of common code is not realized.

Reusing and modifying old code in this manner is clearly haphazard and depends solely on a programmer's ability to judge what code segments can safely and effectively be reused in different contexts. An extremely slow and error-prone process, it is still perceived by many as more desirable than writing programs from scratch.

However, the programmer is faced with a dilemma. If he reuses old code, he may save time and have fewer errors in his program because he is using already debugged code, but he may also lose time, incur more errors because of side effects and end up with a program that is not very efficient.

Clearly, a mechanism is needed whereby programmers can safely re-

Number One Add-On

ALL PRODUCTS ARE XT COMPATIBLE

Communications

NEW Communications Products
1. 5251 Terminal Emulator
2. Local Area Networking Product

Advanced Comm. Card (CC-232)
• Programmable to communicate in Bisync, SDLC, HDLC, and Async protocols.
• Two Ports of RS 232

CC-332 For use with AST-3780
• An IBM 2780/3780 RJE Emulator • Supports Bisync point-to-point communications protocol • Allows file transfer between Host & IBM PC • Ideal for IBM System 34, 38, 4300

AST-SNA
• Emulates IBM 3274 Model 51C Control Unit • Emulates 3278 Display Station • Emulates 3287 Type Printer • Optional 3770 Emulation • Cluster Controller Operation • Protocol Converter Support

ComboPlus™
• Features 64K-256K Me
• One Clock Calendar (s
• One IBM Compatible A Port (opt.) • One IBM Com ble Parallel Printer (opt.) • Battery Backed-up Clock Calendar (opt.)

AST products are available from Computerland, Entre', ComputerMart and selected dealers worldwide.

Call us and make an appointment to see us after your NCC visit.

SOFTWARE MAINTENANCE

IN DEPTH

use code to solve common programming needs without experiencing undue maintenance side effects.

One method aimed at speeding development and simplifying maintenance is structured programming. Beginning with a very high-level "concept" language, an abstract problem is gradually refined until a complete working program written in conventional programming language can be produced.

This methodology, when used properly, can be of great assistance in writing programs. However, it is not much help when it comes time to modify the program since the high-level "concept" statements have now been replaced by actual code, obscuring once clear logical pathways and making the overall structure of the program much harder to understand.

'So-called fourth-generation languages or black box programming aids that hide information or details from the user suffer because they cannot effectively accommodate sophisticated application requirements.'

In addition, modifications are done in a patchwork fashion, altering the logical structure of the overall program in ways that are often difficult to detect. Several modifications further down the road, the program has lost any semblance of the structure it once had.

Chainsaw for Butter

So-called fourth-generation languages or "black box" programming aids that hide information or details from the user suffer because they cannot effectively accommodate sophisticated application requirements. By definition, black boxes cannot be opened up and their internal workings modified to accommodate changing needs.

For simple applications, these tools can greatly speed development. However, as needs become more complex, the powerful verbs embodied in these languages begin to hinder the programming effort, being unable to address complex requirements. It is a bit like using a chainsaw to cut butter. There is no method of easily incorporating unusual requirements below a certain level of abstraction.

Subroutine libraries have traditionally been used as repositories of reusable code. Solutions to common programming problems are written as external subroutines and placed in a common library for general use. Anyone can use these routines to solve specific problems in the course of developing or modifying an application.

However, when a subroutine fails to meet a programmer's exact needs, problems arise. He can either change the routine to meet needs, implying a very difficult retrofit with potentially horrendous maintenance side effects, or he can create another routine in the library with similar but subtly altered characteristics.

But eventually two versions become three, then four, then more. Soon it takes longer to locate and evaluate a subroutine as a candidate for reuse than it takes to write the routine from scratch. Clearly, subroutines do not serve as the ideal vehicle for code reuse, nor do they deal effectively with issues of code modification that on occasion have caused systemwide disruption of programs using common subroutines.

No Flexibility

A subroutine is a representation for a function that is not adaptable at program construction time. It may have considerable runtime flexibility, but at the time of actually molding into a program, a subroutine has no flexibility at all.

Lack of flexibility also explains why the software industry has largely ignored the potential of the code generator. A generator's strength derives from being an expert about a

Products for IBM PC

Multifunction Cards

All Multifunction Products include:
• SuperDrive™ – a Disk Emulator Utility Program
• SuperSpool™ – a Printer Buffer Utility Program

Optional: New ConnectALL™ Connector Mounting Bracket

I/O Plus™
Maximum 6 Functions (no memory) • Clock Calendar (std.) • IBM Compatible Async Port #1 (std.) • IBM Compatible Async Port #1 (opt.) • IBM Printer Port (opt.) • SuperDrive (disk emulator prog.) • SuperSpool (print spooler prog.)

ConnectALL™
NEW! AST Proprietory Connector Mounting Bracket (does not include cables shown in illustration)

MegaPlus™
• 64K-512K (with MegaPak) • Two IBM Compatible Async Ports (1 std., 1 opt.) • One IBM Parallel Printer Port (opt.) • One Battery Backed-up Clock Calendar std.) • Ideal for Concurrent CP/M, MBA, VISI Series software packages.

AST RESEARCH INC.
Dealer Inquiries Welcome
2372 Morse Avenue
Irvine, Calif. 92714
(714) 540-1333

IN DEPTH

specialized type of processing. It does not try to be a general-purpose programming language.

After a first pass through a generator, there are inevitably changes to be made to the resulting output. Ideally these changes belong in the notation that feeds into the generator. But doing so means clobbering the hours of hand editing invested in the output of the generator's first pass. Sadly, further patching of the generated source code becomes the only recourse, and the generator's productivity and maintenance potential shrinks to relative insignificance.

To be really useful, a code generator must be restricted in scope and provide some mechanism that allows the programmer to reuse the generator while not losing the hours of work he has already spent tailoring the initial generator output.

Divide and Conquer

The shortcomings of code generators, subroutines and current programming practices all underscore the need for a methodology that takes advantage of the functional overlap between programs and permits code to be reused without risk.

The key is that *most programs contain little necessarily unique code.* More importantly, although each program may contribute only 10% of essentially new code to the system, the entire program must be maintained forever as if it were unique. Recognizing this fact permits development of a methodology whereby unique code is stored separately from common, reusable code so it can be maintained independently.

Frame technology makes it possible to resolve effectively the problems associated with code reuse and modification. Frames are best explained by contrast with programs. Whereas a program is a solution to a single problem, a frame is a single solution to many related problems. While traditional programs manipulate and produce data, frames are used to manipulate and produce programs.

Frames are not new concepts. Marvin Minsky of MIT introduced the notion of frames in an artificial intelligence context. Frames permit the "cut-and-paste" style of conventional programming to be replaced with a formal manufacturing process in which the standard subassemblies are frames.

From a maintenance point of view, frames permit the unique or essential parts of a program (that make it distinct from all others) to be defined and stored separately from the reusable code. Rather than being scattered throughout a 30- or 40-page source listing, the essential parts of a program are stored in one location.

A frame can become a standard, reusable solution structure — a software subassembly from which programs can be manufactured as an application of the frame. Using a frame means much more than simply copying code; when constructing programs from frames, arbitrary amounts of code can be automatically inserted in predefined "slots"

How Cromemco makes its System One doubly valuable.

The Cromemco System One gives you all the versatility and performance you need to tackle the most complex computing problems.

Dual microprocessors give you a 68000-based machine that also runs Z-80 programs. The 68000, with its 32-bit architecture, gives you superior processor capabilities and is supported by an extensive line of high level software. The Z-80A lets you use the largest base of existing application software available. Now you can get the best of both worlds in one integrated, expandable, low-cost system.

It's available with either

SOFTWARE MAINTENANCE

IN DEPTH

within the frame, renaming variables and so on.

Unlike subroutines, as a frame evolves it never compromises programs written using an earlier version of the frame. Programs using a new or modified version of a common frame will only "recognize" the current version, while older programs will remain unaffected by later changes and need not be retrofitted.

Should a program ever need to be rebuilt, the text produced from the frame at the time the program was first written will automatically be reproduced.

In addition, problems associated with traditional generators are avoided by simply emitting frames instead of raw source code. Using frames, program generators can support the entire life cycle of each program's development and maintenance, rather than the one-shot bootstrap role they conventionally play.

Frames are organized into hierarchies, the most general frames progressively refined by more specific ones. All that is left to create and maintain is a frame containing the code unique to a given program (see discussion on In Depth/46).

File maintenance is a good example of how model solution frames can be set up. Figure 1 (on In Depth/48) outlines the logical structure of a frame hierarchy for designing file maintenance programs. On the left is a model solution frame for general file maintenance procedures at the highest and most abstract level. The terms *Initialize*, *Maintain Data* and *Disconnect from Data* all refer to processes that are carried out at some lower level of the hierarchy, moving from left to right.

These processes are coded either as raw code (*Extract System Info* in column 2) or other frames.

The shaded regions at each level of the hierarchy represent "slots" where code can be inserted at the time the frame is copied to produce source code. The frame user can, for example, supply custom code to fill the slots prior to, or following, initialization. Some slots are predefined but may be overridden at source construction time; these are represented by the shaded regions containing text.

An example of this process is the *Connect User to Data* slot in column 1 that is predefined by the frame indicated in column 2. If the frame user supplies no code to fill the slot, the frame from column 2 will be used. If, however, the frame user supplies custom code to fill the *Connect* slot in column 1, then the frame in column 2 will not be used.

It may seem that frame hierarchies can become complex and hard to use. However, the frame user does not have to understand or even be aware of the hierarchy. Templates (program skeletons) provide prescriptive, rigorous check lists of all the possible points of customization, reducing the design process to a linear, fill-in-the-blanks exercise from which a specification file is produced that precisely describes the program to be

(Continued on In Depth/48)

a full 21 Mbyte hard disk and a floppy disk or with two floppy disk drives. That puts enough processing power at your fingertips to tackle the tough jobs. But with Cromemco, you get more.

Software is where Cromemco's System One really shines. The CROMIX* operating system, inspired by the UNIX* system, runs on both the 68000 and Z-80A and provides a similar user interface, improved file security, and record level locking. CROMIX is so flexible it lets you run your CP/M* based programs, too.

We offer a full complement of high level languages as well, including FORTRAN, PASCAL, COBOL, C, BASIC, and ASSEMBLER.

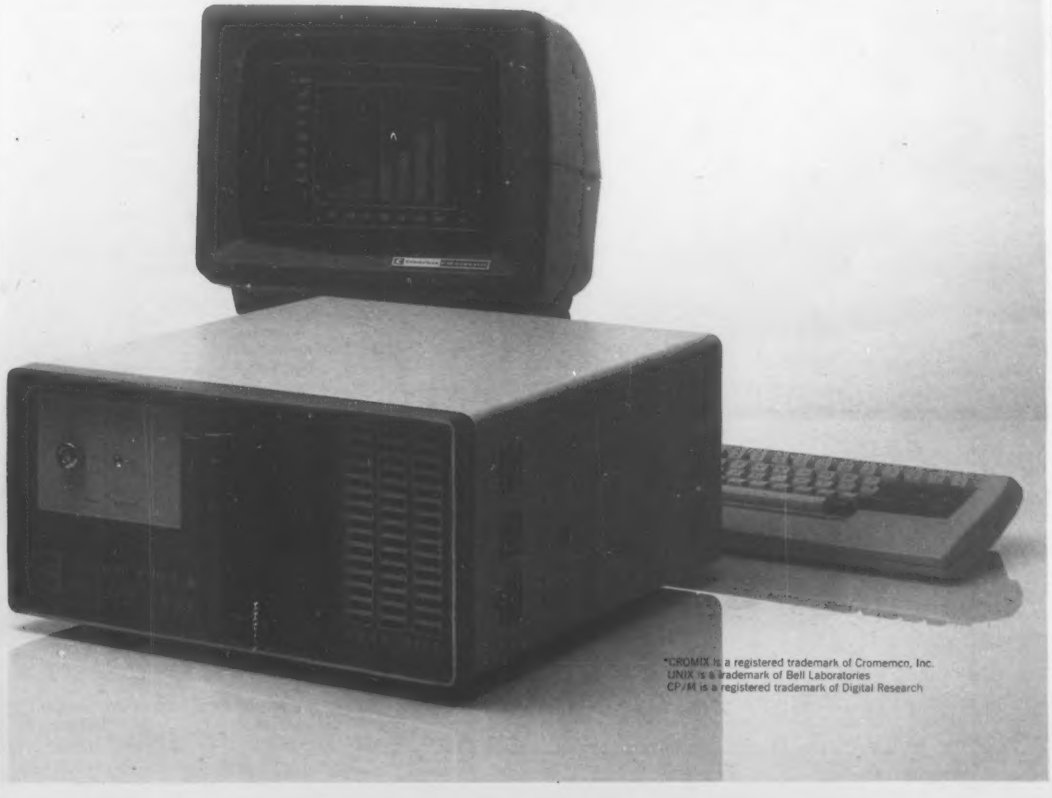
The System One is a desktop computer and can support one user or multiple users. It is one of Cromemco's full range of expandable computer systems.

Since all Cromemco systems are based upon the standard IEEE-696 bus, you can configure and expand them with our broad line of board level products. To enhance throughput, our systems can use our C-10 personal computer as an intelligent terminal.

Whenever your applications require reliable computing for business or engineering use, Cromemco gets the job done.

Call us today for our new Systems Catalog or for our nearest dealer or distributor. Or write Cromemco, Inc., 280 Bernardo Avenue, P.O. Box 7400, Mountain View, CA 94039. Tel. (415) 964-7400. In Europe: Cromemco A/S, Vesterbrogade 1C, 1620 Copenhagen, Denmark.

Cromemco



*CROMIX is a registered trademark of Cromemco, Inc.
UNIX is a trademark of Bell Laboratories
CP/M is a registered trademark of Digital Research

IN DEPTH

The Principles of Frame Design

Frames are meant to be an embodiment of standard, reusable solutions to problems. Being standard and reusable in turn imposes some strong constraints on what constitutes a frame and how it should be structured.

Many existing programs and routines may be candidates for frames. Significant engineering effort will usually be required to ensure that the resulting frame possesses proper standards, is functionally complete and, most importantly, is easily adapted into most contexts of use.

Frames themselves contain the standard functionality as well as prescribing the style in which they must be customized into finished products. Each frame has a distinct, sharply defined goal, useful in several contexts; and it can evolve through time by generalizing its goal and/or improving its efficiency without having an impact on other frames.

There are two types of frames: so-called subroutine frames and mainline frames. A subroutine frame contains a collection of interdependent operators and data management routines, cooperating over a common data structure. In this sense, a subroutine implements an abstract data type. Mainline frames (superroutine) represent control flow scenarios which accomplish generic goals involving a mixture of abstract data types. While mainline frames do not usually reference each other, subroutine frames often do.

Frames ought to be structured so that solutions to subproblems are coded once only. To be used in many contexts, each frame should not do too much. The wider the contexts of its reuse, the more its functionality should be independent of all other frames in the system. A frame should contain a small number of parts, each doing a different, well understood thing and using good structured programming style.

It is a fact of life that software is general and frames, in particular, must change as requirements change. The redeeming features of frames are that they evolve much more slowly than ordinary software, and when they do evolve they can absorb arbitrary amounts of change without victimizing innocent previous users. Each frame simply needs to contain a unique version control symbol such as "Frame-VERSION," where "Frame" is the unique name of the frame. Then, any text that is unique to version 1.2, say, is placed within the version 1.2 select clause.

For example, the frame user references the frame by:

```
.REPLACE FRM6-VERSION BY V0102
.COPY FRM6
```

Inside FRM6 the versions are selected by:

```
.SELECT ;FRM6-VERSION
.WHEN V0101
   frame text for version 1.1
.WHEN V0102
   frame text for version 1.2
.END-SELECT
```

This technique also copes with additions and deletions because any .WHEN clause can be left empty. Even changes to the version naming conventions (e.g. separation into a two-level version hierarchy) can be handled by putting the older scheme into an .OTHERWISE clause which has its version .SELECT nested within. Should the entire frame need rewriting, the obsolete frame code can be placed under an archive file name and referenced from the rewritten version. This technique avoids cluttering up the new code yet is completely transparent to innocent previous users.

Subassembly frames are major capital assets of any CAP software manufacturer. Techniques to design, apply and protect the assets are vital.

DISCOVER THE DYSAN DIFFERENCE

Pack All Your Troubled Packs and Cartridges in an Old Kit Bag

And Save. Save. Save!

SPECIAL LIMITED OFFER. DOUBLE TRADE-IN VALUE:

If you act now, you can receive twice the trade-in credit you normally earn toward the purchase of Dysan's superior quality disc packs and cartridges. So, pack up your old disused disc packs and contact Dysan by July 31, 1983.

Need more information? Call your nearby Dysan Representative or use our toll free 800-551-9000 number. Or simply fill in the coupon. Discover the difference Dysan's precision magnetic media can make. For your system *and* your budget.

Dysan CORPORATION
Corporate Headquarters
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000

SPECIAL LIMITED OFFER!

☐ Yes, I'm interested in Dysan's Double Trade-In Value Offer.

☐ Yes, I'd like a free copy of your rigid media service brochure.

Name: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: (_____) _____

COMPUTING PLUS AT COST MINUS

Sometimes just a little more capability is enough to improve productivity. More power for peak workloads. More flexibility for special projects. Quicker response to your users' requests.

Unfortunately, just a little often costs a lot. As much as a whole new computer—even though the bulk of that power may go unused as much as 50% of the time.

Martin Marietta Data Systems offers a cost-effective alternative: Remote Computing Services.

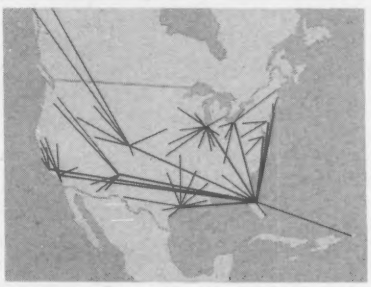
100% UTILIZATION 100% OF THE TIME

Get exactly the amount of information processing capability you need—when you need it. And pay only for what you use. It's the most efficient way yet to satisfy the widest range of user demands without straining your data processing budget.

STATE OF THE ART RESOURCES

Extend your computing capacity with convenient access to the latest IBM and CDC hardware. Our host computer centers offer a virtually unlimited source of processing capability. By tapping into our service, you can maximize productivity without increasing your capital commitment, overhead costs or personnel roster.

ALL THE RIGHT CONNECTIONS



Businesses with multiple locations will benefit greatly by making use of our nationwide data communications network. Send, receive, process and consolidate information from branches and subsidiaries, 24 hours a day, 7 days a week.

The volume of users sharing our network and host centers allows us to distribute costs over a broad base. You'll enjoy the savings and provide extended services while retaining central planning and control.

Yet another way Remote Computing Services can increase your productivity.

Martin Marietta's extensive library of software includes business systems for manufacturers, accountants and engineers, as well as proven data base management systems. And a full range of prompters, optimizers, interactive debugging aids, conversion and training tools are available to make your workload more manageable.

To find out more about extending your services to your user base, return the coupon below or call toll-free at (800) 638-7080. In Maryland: (800) 492-7170. We'll send you our free *Guide to Buying and Using Remote Computing Services.*

☐ Send me your free *Guide to Buying and Using Remote Computing Services.*
☐ Please have a representative call me.

Name

Company

Title

Address

City

State Zip

Phone

Mail to:
MARTIN MARIETTA DATA SYSTEMS
Marketing Services, CW-F
6303 Ivy Lane
Greenbelt, Maryland 20770

MARTIN MARIETTA

IN DEPTH

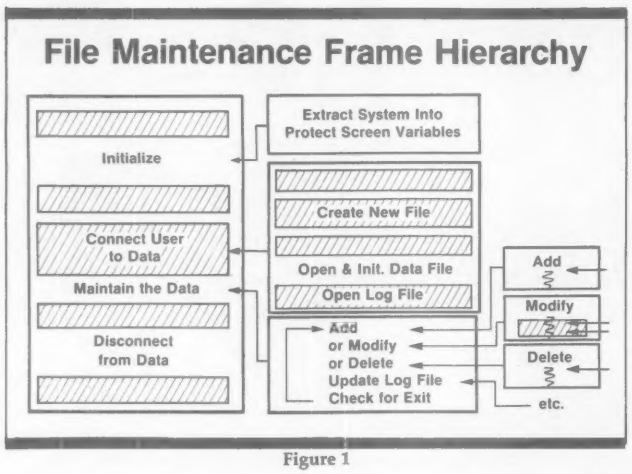


Figure 1

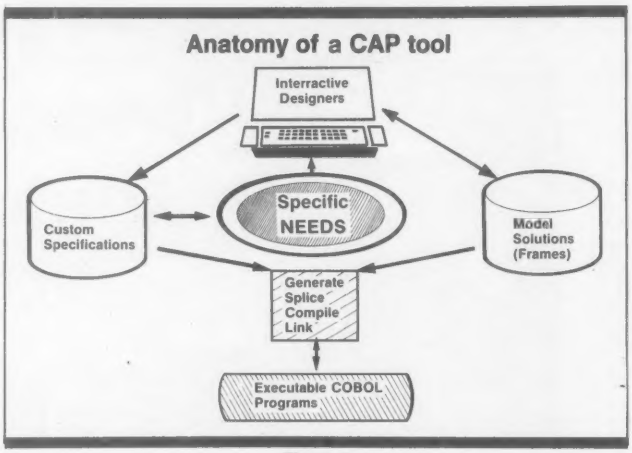


Figure 2

(Continued from In Depth/45)

automatically assembled.

Frames have been implemented in a software manufacturing system known as Computer-Aided Programming (CAP). Figure 2 illustrates how a CAP tool builds a program from specific goal-oriented instructions supplied by the user, automatically blending together standard code modules or frames with computer-generated and custom code to create a working program.

Interactive designers operate at an underspecified level. Only the major functional features of the desired program need be supplied by the user in order to write a complete set of specifications for the program.

Customizers permit editing of program specifications at the optimal level. Here is where all further customization and maintenance of the program is done. At this level, CAP automatically translates the customized specifications into standard code such as Cobol and binary.

Since frames are upwardly compatible, once written, sophisticated functionality can be passed on to all new programs. In a very real sense, frames become the capital assets of a company. Standards are painlessly enforced and the detailed knowledge of a firm's computer applications are retained in an inventory of reusable frames, along with the tools for creating new frames. As a result, loss of invaluable expertise associated with employee turnover is significantly reduced.

The methodology of frames, together with systems such as CAP, promises to significantly reduce maintenance and introduce new methods of automatic program fabrication based on traditional manufacturing processes.

About the Authors

Paul Bassett is vice-president of software manufacturing at Netron, Inc., Toronto, Ont. Theoretical computer science and applied data processing are his areas of expertise.

Scott Rankine, formerly on the staff of Computing Canada, *now serves as research writer at Netron.*

A free report on computer-aided programming is available from Netron, Inc., 99 St. Regis Crescent North, Downsview (Toronto) Canada M3J 1Y9.

Benefit from more employees. Without more employee benefits.

You have a peak-workload need for another programmer and two coders. But just for a couple of months, and you really can't handle all the expenses of full-time employees. Call EDP/TEMPS for just what you need.

- Fully qualified hourly contractors and consultants, with all taxes, insurance and fringe benefits provided
- Available on a day's notice or less
- Professional backgrounds matched to your specific need for immediate cost effective productivity

In fact, the only problem with people from EDP/TEMPS is that you'll hate to let them go.

For complete information, call or write the office nearest you listed below or our Corporate Headquarters:

EDP/TEMPS, INC.
120 Wells Avenue
Newton, MA 02159
(617) 969-3100
(800) 343-4314

TAC EDP/TEMPS® A Technical Aid Company

People who'll work best for you, work for us.™

Baltimore: (301) 265-6500 • Boston: (617) 891-5572 • Cleveland: (216) 749-3060
Detroit: (313) 569-6560 • Los Angeles: (714) 937-1161 • New York City: (212) 947-6033
Philadelphia: (215) 667-2990 • San Francisco: (415) 952-5010 • Sunnyvale: (408) 738-5900
Washington: (703) 893-2400

PRICE RELEASE

The $110.00 SMD/CMD CDC Replacement

REPLACE THIS

WITH THIS

Price Schedule $110.00 each
(Inquire for OEM Discounts)

REFURBISH 100% RETURN $75.00 EACH

Brum-ko will rework your CDC SMD/CMD disk heads—we will refurbish those which are repairable and fill the gap with the Brum-ko Compatible at $75.00 per head for a 100% return.

FEATURES:
1. 3330 High Reliability Slider Technology.
2. Electrically and Mechanically Compatible.
3. High Refurbishment Yields.
4. Suitable for:
   - 9760, 9762, 9764 and 9766 CDC Drives
   - Cartridge Module Drive, 9448 Drives
   - Storage Module Drives for End Users of 40, 80, 150 and 300 Megabyte Drives

* * *

For more information, purchase, delivery or pricing, please call

brum-ko magnetics corporation
301 park road • elkhorn, nebraska 68022
(402) 289-2400
Telex 484390

Rabbit System Gives Micros 3270 Emulation

MALVERN, Pa. — Rabbit Software Corp. has announced Rabbit 3270-Plus, a distributed processing system that reportedly allows microcomputers running under Convergent Technologies, Inc. Ctos, Burroughs Corp. Btos and Bell Laboratories Unix-based operating systems to be used as intelligent IBM 3270 workstations for local and host processing.

The product provides 3270 features and allows data to be manipulated locally. It also allows prefetching of host screens and data, recording and browsing of host sessions, split-screen processing and screen sharing between remote and local processing, a spokesman said.

A suspend/resume feature allows processing without breaking the 3270 session. Read-ahead requests the next screen while the host works on the current one. A browse feature allows review of data without additional host transmissions.

Screen-to-Print produces hard copies of screens; Screen-to-File copies host data for local applications; and Asynch 3270 makes an Ascii device function as a 3270 terminal. Other features include Help screens, cursor select and system/user profiles, which enable one terminal to function as a different device while allowing changing of system features and options to fit the application.

The price is $750 per microcomputer from 1 Great Valley Pkwy. E., Great Valley Corporate Center, Malvern, Pa. 19355.

Study Predicts Growth In Packet-Switching Mart

By Bruce Hoard
CW Staff

NORWALK, Conn. — Year-to-year growth rates in packet switching have exceeded 60% in recent years and strong growth will continue until at least 1990, according to a recent study from International Resource Development, Inc.

The study, which is entitled "Packet Switching, Public Services & Private Systems Markets," says that the past decade has witnessed the transition of packet switching from an experimental technology used by government and a few timesharing firms into one of the fastest growing markets in the telecommunications field.

Furthermore, the study notes that a market for private networks within large organizations has developed "almost overnight."

The study includes 10 sections addressing such topics as packet-switching technology, domestic packet-switched networks, value-added services and trends in packet-switching services.

The section on packet-switching technology explains packet switching's role in data communications and describes the circumstances in which packet transmission is more effective than circuit switching.

Domestic packet-switching companies discussed include Tymnet, Inc., GTE Telenet Communications Corp., Uninet, Inc., Automatic Data Processing, Inc. and Compuserve, Inc.

The rapid growth of international packet networks is also covered. Networks in Canada, West Germany, Belgium, Denmark, Spain, Finland, France, Italy, Norway, the Netherlands, the UK, Sweden, Switzerland and Japan are described in the report.

The study maintains that value-added services "ride on top" of the basic packet-switched transmission offerings and notes the relationship between the value-added market and the basic transmission market. Data base services, teleshopping, telebanking and other transaction-related and information-related services are explored in the study.

A detailed market analysis estimates the current size of the packet-switching market, broken down according to specific application, as well as current market share information.

In addition, figures are given for the public network segment, the private network segment and the X.25 network interface device segment.

Industry trends are discussed on both a macro and a micro level. On a macro level, the reasons for the increased growth are laid out.

On a micro level, however, the likely confrontations between participants in what should be an increasingly competitive environment are explained. That competition will occur between public and private vendors, as well as within the particular market segments, according to the report. In addition, the roles to be played by IBM and AT&T are mentioned.

Projections for future packet hardware shipments, in terms of numbers and dollar values, by market segment are addressed in another section. A discussion of growth expected in specific value-added services available on the networks and the impact of growth on packet-switching markets in general is also included in the study.

Another section in the study offers company-by-company discussions of current products, likely avenues of entrance into or expansion within the market and the prospects for success within the industry of those firms presently involved in packet switching. It also identifies and discusses those firms that are likely to become involved.

The 174-page study of packet switching is priced at $985, and further information can be obtained from International Resource Development, which is headquartered at 30 High St., Norwalk, Conn. 06851.

Lee Data Adds Display Station, Other Units to 3270-Type Line

MINNEAPOLIS — Lee Data Corp. has announced the addition of six products to its line of IBM 3270-type terminal systems.

The new products include:

- Model 1216 — a display station to compete with IBM's recently announced Model 3178 display station. The single-unit purchase price for the Model 1216 with a data entry-style keyboard is $1,411, the vendor said.
- Models 321 and 421 — large cluster control units said to let users access two or more IBM-type mainframes by combining local channel and remote interface in a single controller. On a purchase basis, the Model 321, with 16 dislays, is priced at $39,132, while a Model 421 equivalent configuration is priced at $50,988, according to the vendor.
- Models 306 and 308 — remote-control units compatible with IBM's 3274-51C and 3274-61C units, respectively. Single-unit prices are $5,212 for the Model 306 and $7,057 for the Model 308, the vendor maintained.
- A software facility that reportedly permits Lee Data's Series 400 3270/asynchronous communications system to emulate a Hewlett-Packard Co. 2624-B Ascii terminal. Any of the 3270-compatible displays can be upgraded for $403 on a purchase basis.

Leasing terms are available from Lee Data, 10206 Crosstown Circle, Minneapolis, Minn. 55344.

HP-Compatible Terminal Added To Direct's 800 Series CRT Line

SANTA CLARA, Calif. — Direct, Inc. has expanded its 800 series of CRT terminals to include an entry-level, block-mode terminal said to be fully compatible with Hewlett-Packard Co.'s 1000 and 3000 systems.

The Model 820 is said to feature two pages of display memory, full video enhancements and on-screen program function keys. The features reportedly allow users to run such HP application programs as V/3000, MM/3000 and Vplus, a vendor spokesman said.

Other features include a standard line drawing set, an 80-col display and such user preference features as modifiable screen intensity and scroll rates, according to the spokesman.

The unit costs $1,495 and information is available from the vendor headquartered at 4201 Burton Drive, Santa Clara, Calif. 95050.

MCI Offers West Germany Link

RYE BROOK, N.Y. — MCI International has announced that telex subscribers throughout the country will be able to communicate via its Western Union International, Inc. subsidiary with teletex subscribers in West Germany, the company has announced.

MCI International subscribers can use a variety of communications equipment, including teleprinters and communicating word processors to prepare, edit and transmit messages via telex to teletex subscribers in West Germany.

MCI Communications Corp. provides through its common carrier subsidiaries domestic and international telecommunications services. MCI is located at One WUI Plaza, New York, N.Y. 10004.

Feature Detachable Keyboards

Televideo Offers CRT Terminals

SUNNYVALE, Calif. — Televideo Systems, Inc. has introduced two CRT terminals that feature detachable keyboards, tilt-and-swivel screens, one-button off-line editing, split-screen mode and nonvolatile programmable function keys.

The Televideo Models 915 and 924 also include built-in memory for off-line editing, the vendor said.

The 924 reportedly has four pages of memory and the 915 is said to carry up to two pages of memory.

Both terminals have built-in printer ports, a vendor spokeswoman said.

Each terminal has from 16 to 32 function keys, which are programmable on the 924. The function keys on the 924 are nonvolatile: Once they are programmed, they remain so until changed by the user, according to the vendor.

Said to be available in June, the terminals are priced at $695 for the 915 and $895 for the 924, according to the vendor.

More information is available from Televideo Systems, Inc., located at 1170 Morse Ave., Sunnyvale, Calif. 94086.

ITI Unveils 'Linkup' For IBM

SCOTTSDALE, Ariz. — Information Technologies, Inc. (ITI) has unveiled Linkup, a communications package for the IBM Personal Computer.

Linkup's nucleus is a programmable hardware module that supports all industry-standard protocols and emulates commercially available terminals at data transfer rates up to 56K bit/sec, the vendor said.

Initial Linkup software options will support TTY, Digital Equipment Corp. VT52/100, IBM 3101 and 2780/3780 emulation, Ascii Block Protocol and a print spooler.

Linkup reportedly supports unattended operation, giving users access to computer services at night, on weekends and holidays when common carrier and computer service rates are lower.

Linkup costs $1,195, including the hardware board and software options, a spokeswoman said. It will be available in June from ITI at 7850 E. Evans Road, Scottsdale, Ariz. 85260.

Display Out For IBM 3270

DALLAS — Harris Corp.'s Interactive Products Division has announced a 12-in. display for IBM 3270 communications. The smaller display was designed for desktop operations where a small footprint is required.

The Model 9178 is said to be functionally compatible with the IBM's recently announced 3178 display. The 9178 display supports all Harris keyboards, including the new 109-key keyboard option, and is available with either green or amber phosphor screens.

The 109-key keyboard option is an ergonomic model featuring a low-profile design and ease of operation.

The Model 9178 will be available in September for either lease or purchase. The purchase price for the 75-key keyboard unit is $1,462; the 87- and 109-key keyboard configurations cost $1,524. Harris Corp. can be reached through P.O. Box 400010, 16001 Dallas Pkwy., Dallas, Texas 75240.

Programmable Controller Boasts Speed, Smart I/O

ANDOVER, Mass. — Gould, Inc. has announced a high-speed programmable controller tailored to mid- and large-control applications that require a combination of high speed, distributed intelligent I/O, large data/recipe storage and expandability.

The 584L programmable controller reportedly has a capability for up to 8,000 I/O points, 10,000 registers, 32 distributed Ascii ports and memory sizes up to 64K bytes.

The software functions of the controller include floating-point mathematics, double-precision math, square roots and logarithms.

Support for the 584L system is provided by a range of I/O modules.

The 584L sells for $19,000. The vendor can be reached through Gould's Modicon Programmable Control Division, Box 83-SVS, Andover, Mass. 01810.

Your key to success

CICS / VS training at Chubb

If CICS is an important part of your job, then the training you choose is just as important. Learn the techniques productive CICS programmers need to know.

Come join the group of satisfied clients at *Chubb Advanced Training Center*. Our CICS/VS Command Level class is skill oriented. Emphasis is placed on the practical knowledge needed to be immediately productive. Informative lectures, comprehensive manuals and practical workshop assignments guarantee a solid understanding.

Classes are presented publicly, in-house and to regional training groups in a consortium format.

June 6-10.....New York City

July 25-29.....New Jersey

For more information on the courses offered by Chubb Advanced Training Center send for your free catalog or call (201) 467-7680.

CHUBB ADVANCED TRAINING CENTER
480 Morris Avenue
CHUBB Summit, NJ 07901

SNA X.25

NOT ANOTHER BLACK BOX — A Software Implementation Within Your Product Hardware

- Custom software to allow your product to interface networks and emulate other vendors equipment (including 3278)
- Software that is installed and currently being utilized by computer and terminal manufacturers on Zilog Z-80, Z8000, Intel 8088, etc.
- Product oriented communications software compatible with SNA, X.25, BSC for product developers to insure timely, cost effective marketplace entry
- Close contact with your engineers to adapt our software to your hardware
- Software, source, and full documentation delivered

Systems Strategies/Advanced Technology Division
Specialists in Data Communications Software
225 West 34th Street
New York, New York 10001
(212) 279-8400

introducing
Dial-Up 3270

LineMaster
An intelligent device for dial-in access to your mainframe 3270 line.
LineMaster is a communications watchdog which keeps a line in service until a user dials in.

• For any remote 3271/4/6 line, up to 19.2K baud
• Compatible with any 3270 emulator including microcomputers • Connects between modem and mainframe
• Installs in minutes

$639.

MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

CICS APPLICATION DESIGN... WHO NEEDS IT?

You do . . . to meet your target dates, get the best response time, and to avoid costly confusion.

In SysEd's 4-day CICS Application Design Course you'll explore, discuss and analyze all the unique CICS facilities—their limitations and flexibilities. Our lively workshop sessions and course manual use extensive and carefully designed case studies to cover in depth the most common design problem areas. Special attention is given to performance problems (how to do it better), design trade-offs (choosing one solution over another), and recovery considerations (if the system fails).

Classes are held regularly at SysEd's fully equipped classroom/computer facilities in New York City, Chicago, San Francisco and Dallas. Class size is limited, so applications are accepted on a first come, first serve basis. Customized course offerings are available for on-site sessions at company installations. SysEd's courses include CICS Command Level, Macro Level, Internals, Application Design, and VSAM.

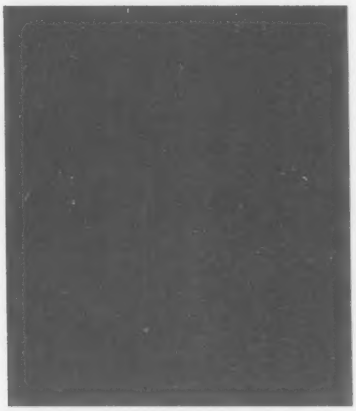
For information, call David Shapiro (212) 889-3386.

SYS-ED

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3386

Two ways to take 3270 where it's never been before.

True blue.

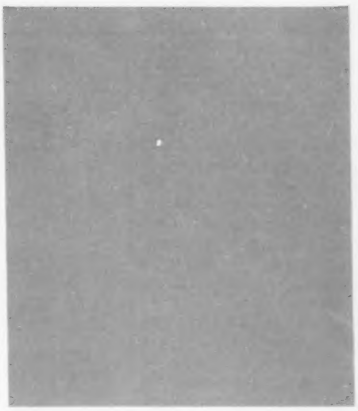


If you're thinking of extending your 3270 network, true blue is a great way to go. Just install IBM's 3270 series controllers, terminals or printers. As many as you need. Or can afford.

Then connect them. If the new IBM peripherals are going across the room or down the hall, you'll need a little high-cost cable. And if they're going across town or further, add some very expensive leased lines.

True blue. If you can afford it.

Or an economical, reliable, secure 3270 network of a different color.



Fortunately, there's a better way.

Datastream.

Our Remote Cluster Controllers let you take your 3270 network anywhere you need it. You can build clusters using low-cost ASCII terminals, printers and personal computers. The Remote Cluster Controller provides mainframe compatibility and 3270 functionality to the entire cluster.

And we've got a list of features that won't quit. Models for either 3270 SNA or 3270 BSC networks. Direct-connect or dial-in access from every terminal in the cluster. Sophisticated password security. Remote diagnostics and system upgrade. Multi-host support. And more.

If you want to take your network down the hall or across the country. Without the heavy expense of cables, leased lines or IBM peripherals. Call us.

Datastream. You can't afford to overlook us.

Call toll free: 800-952-2500
(Outside California)

DATASTREAM

1115 Space Park Drive
Santa Clara, CA 95050
408/727-2980

Canoga Mux Runs at 76.8K Bit/Sec

CANOGA PARK, Calif. — Canoga Data Systems has announced an 8/16 channel multiplexer said to be capable of synchronous data rates up to 76.8K bit/sec with speeds from 2,400 to 76.8K bit/sec and asynchronous operation up to 19.2K bit/sec.

Housed in a rack-mounted chassis, the CMX-816 provides individual data rate programming on each channel in the synchronous mode. The CMX-816 can reportedly be configured with RS-232, RS-422 or V35 interfaces. It also provides three duplex control functions, according to a vendor spokesman.

The CMX-816 is priced at $2,750. More information is available from the vendor at 21218 Vanowen, Canoga Park, Calif. 91303.

Communications Series Fits Osborne 1 Micro

WASHINGTON, D.C. — Cypher Communications Technology, Inc. has announced a series of communications software and hardware for the Osborne 1 personal computer.

Cycom 1 is reportedly aimed at the individual user who requires a communications package for use in file transfer, conversation, dumb terminal emulation, electronic mail or information utility access. It is said to be supported by an autodial, autoanswer modem.

Cycom 2 is said to convert the Osborne 1 into a secure communications terminal. It combines Cycom 1 software with a hardware component that allows for end-to-end communications, including electronic mail, which is transparent to communications media.

Cycom 2 is said to originate and answer telephone communications automatically. It also automatically logs a user on to a remote system, such as a time-sharing service, information utility, data base or microcomputer, according to a vendor spokesman.

Cycom 1 sells for $120. The price of Cycom 2 is $450. More information is available from Cypher at Suite 1005, 1712 I St. N.W., Washington, D.C. 20006.

Publication To Focus On Europe

MORRISTOWN, N.J. — Probe Research, Inc. has announced a monthly publication devoted to the European telecommunications marketplace and industry.

Researched in Europe and edited by Probe, *European Telecommunications* will deal with such issues as deregulation and new market openings, led by the UK. Also described will be the leading European positions in cellular radio, videotex, teletext and mass information access terminals. National policies to export telecommunications products will also be addressed.

Subscriptions cost $180 in the U.S. and Canada and $195 overseas.

Probe can be reached through P.O. Box 590, Morristown, N.J. 07960.

Dynapac Stat Mux Handles Eight Terminals

ALEXANDRIA, Va. — Dynapac has introduced its DP-1000 statistical multiplexer, which reportedly accommodates up to eight terminals at each end of a line, enabling the user to mix different terminal characteristics such as speed, flow control, line feed insertion, echoplex and padding delay for mechanical response.

DP-1000 is said to use proprietary multiplexing algorithms based on schemes used in packet-switched networks.

The price of the DP-1000 is $995. More information is available from the vendor at 6464 General Green Way, Alexandria, Va. 22312.

To a world of chaos and confusion, rational approach to

The OPEN World
A corporate commitment
Northern Telecom's commitment reflects the importance of information to the future of all organizations... to business, large or small, government, and others.
Information management is fraught with complexity...in technology...in the diversity of products...and in a bewildering array of suppliers.
It is to this environment that Northern Telecom brings "Open Protocol Enhanced Networks"—OPEN World—universal information management systems through communications.
Communications is the common denominator for effective information management.
OPEN World is intelligent systems that can evolve and grow to meet any communications requirement.
OPEN World is versatile, planned information management ...communications products and a universal planning framework.
This is Northern Telecom's commitment to information management...OPEN World.
Walter F. Light
Chairman of the Board and Chief Executive Officer
Northern Telecom Limited
Edmund B. Fitzgerald
President
Northern Telecom Limited

OPEN World: our commitment to information management systems that meet the Five C's—continuity, compatibility, congeniality, control and cost-effectiveness.

Today, most organizations realize how critical it is to manage information effectively. After all, information is a key resource. So the choices you make today for data processing, voice and data communications, word processing and image communications will determine, to a large extent, your future success.

But deciding on an information management system can be very complex.

Obsolescence is a constant concern. Because of the rapid pace of technology, today's innovation too often becomes yesterday's generation. To compound the problem, the needs of your organization are also constantly changing. How do you know what your requirements are going to be next year?

Also contributing to the complexity is the ever-growing number of suppliers offering a vast array of products and services. Products, which for the most part, are incompatible.

It is a market characterized by chaos and confusion.

OPEN World-finally, an approach that makes sense.

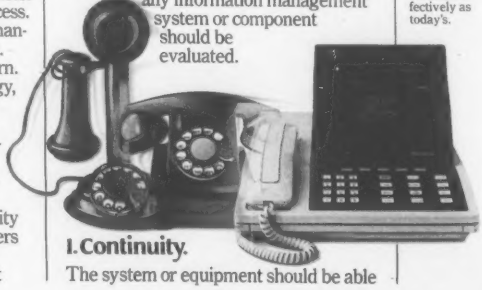
Northern Telecom has introduced a rational approach to the planning and building of information management systems: the OPEN World.* It is based on the simple concept that all information can be handled in one integrated system. One system that will allow many makes and types of equipment and transmission highways to work together harmoniously. One system that will give you freedom to choose from many different suppliers. One system that will evolve to protect against obsolescence.

The OPEN World is a planning framework embodying these concepts, and a program for the introduction of products and features to enable you to plan and build optimum information systems, designed around the key common element—communications.

We're backing the OPEN World with a research and development commitment of one billion dollars to be spent on R & D in the next five years on OPEN World systems, products and features.

The Five C's-five criteria to judge our approach. Or theirs.

There are five key criteria against which any information management system or component should be evaluated.



An example of continuity: we have evolved the telephone network to allow yesterday's equipment to work as effectively as today's.

1. Continuity.

The system or equipment should be able

*Trademark of Northern Telecom Limited.

Runs on HP, DEC

Stat Mux Handles Eight Terminals

PITTSBURGH — Black Box Catalog has announced a data concentrator said to be a statistical multiplexer designed to allow two, four or eight terminals to share a single line.

Designed for use with Hewlett-Packard Co., Digital Equipment Corp. and other minicomputers, it requires no changes to existing hardware or software in order to provide each terminal with an apparent direct connection to the host computer.

The terminals may operate in either full-duplex or half-duplex mode at data rates up to 9,600 bit/sec. The concentrator's composite (output) rate can be 9,600, 1,800 or 1,200 bit/sec asynchronous or any synchronous rate within that range.

Standard features include automatic retransmission on error, do-it-yourself installation, troubleshooting and terminal-activated channel.

A two-channel concentrator costs $1,050, a four-channel concentrator is priced at $1,400, and an eight-channel concentrator costs $2,200. Black Box Catalog can be reached through P.O. Box 12800, Mayview Road at Park Drive, Pittsburgh, Pa. 15241.

Raytheon PTS-2000 Gets Local Format Storage

NORWOOD, Mass. — Raytheon Data Systems Co. has announced a local format storage feature for its PTS-2000 Information Display System.

The local format storage option offers users of IBM 3270-type CRT terminals the option of storing more than 100 formats at a remote site. A typical user can reportedly realize a 67% savings in line utilization and possibly cut the number of terminals on each host line. The product can also improve response time and cut operation costs at low speeds, the vendor claimed.

The local format storage feature is available in a special version of Raytheon's large cluster controller operating either in Binary Synchronous Communications or in IBM's Systems Network Architecture/Synchronous Data Link Control modes, the vendor said.

Formats can be created by the user at the terminal location or they can be downline loaded from the host, then stored in the PTS-2000's controller. The information is then compressed in memory and decompressed when brought onto the screen. The local format storage option was designed for use with IBM DB/DC products such as CICS and IMS and costs $8,100, the vendor said from 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Northern Telecom brings the first information management.

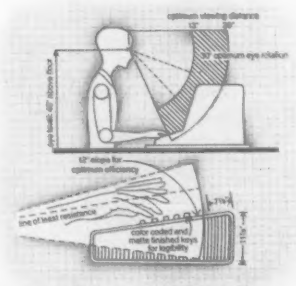
In the OPEN World, many different makes and types of equipment can work together.

to evolve to meet future needs, to accommodate future technological developments, and to provide new features. Only in this way can it be "obsolescence-proof."

2. Compatibility.

Many makes and types of equipment must be able to work together as a harmonious whole. Components and systems from different manufacturers and transmission channels from different suppliers all must be compatible.

3. Congeniality.

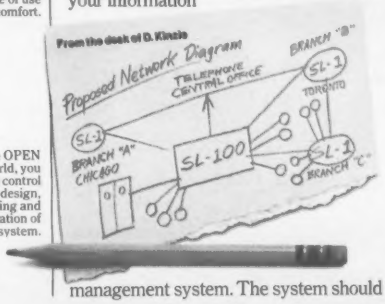


If people find equipment or systems intimidating, unattractive, or difficult to use, they simply won't use them. Even advanced technology should be attractive and simple to use.

OPEN World systems are congenial — designed for ease of use and comfort.

4. Control.

You, not a supplier, should be in control of your information

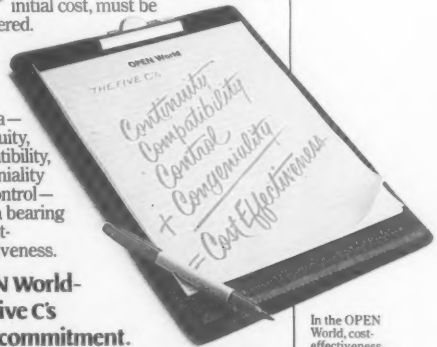


In the OPEN World, you can control the design, building and operation of your system.

management system. The system should not lock you in to a single source or limit options in the future. And the system should also provide the tools to control the cost and flow of information in your organization.

5. Cost-effectiveness.

The bottom line. Long-term financial considerations, as well as initial cost, must be considered. All of the other four criteria — continuity, compatibility, congeniality and control — have a bearing on cost-effectiveness.



In the OPEN World, cost-effectiveness is the bottom line.

OPEN World — the Five C's plus commitment.

As the international leader in digital telecommunications, the technology that ties computers and communications together, Northern Telecom is in the unique position of being able to make the OPEN World a reality.

Our technological heritage allows us to meet the five criteria conclusively, as we have always done, for example, in providing equipment for the telephone network. When you place a long distance call, it may pass through many generations of equipment, all working smoothly together. Use of the telephone is simple, although much complex technology is involved. And the relative cost of using the telephone has steadily decreased, although its capabilities are constantly expanding.

In supplying telephone equipment for over 100 years, we've met all the criteria we propose for business communications.

If you'd like a brochure describing our commitments to each of these criteria, or more information about the OPEN World, write OPEN World, Northern Telecom Inc., 259 Cumberland Bend, Nashville, TN 37228.

nt northern telecom

OPEN World. For information management, it's the best of all possible worlds.

Modem Out From Inmac For Micros

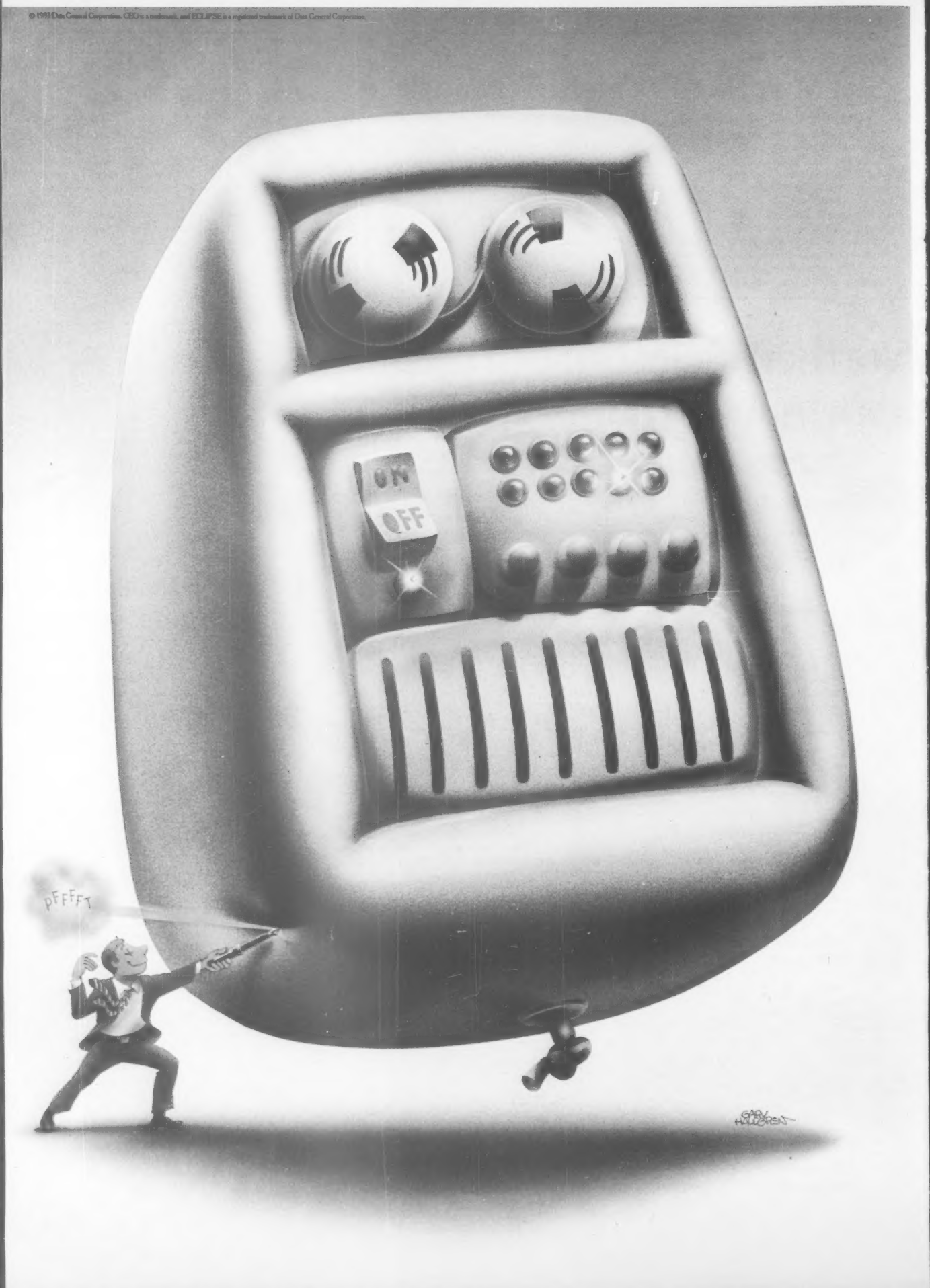
SANTA CLARA, Calif. — Inmac Corp. has introduced a portable 300 bit/sec modem said to put telecommunications capabilities within an economical reach of personal computer users.

Requiring only a push-button telephone and a modular RJ-11 jack for operation, the Model 8065 reportedly runs on a self-contained 9V battery that provides up to 50 hours of continous use and allows total portability. An audible carrier detect signal tells the user that data is being received and properly entered.

The modem reportedly transmits both voice and data signals over common telephone lines. Other features include an automatic mode selection from originate to answer and vice versa, an automatic talk/data switch and a carrier detect signal.

Guaranteed for one year, the Model 8065 costs $125, Inmac said from 2465 Augustine Drive, Santa Clara, Calif. 95051.

© 1983 Data General Corporation. CEO is a trademark, and ECLIPSE is a registered trademark of Data General Corporation.



DATA GENERAL INTRODUCES THE OFFICE AUTOMATION SYSTEM INGENIOUSLY POSITIONED BETWEEN THE OVERPRICED AND THE OVERPROMISED.

Until now you've had two choices for automating a large office. A system from the company that seems to feel price is no object. Or a system from the company that promises complete systems which turn out not to be complete.

Now Data General offers the office automation system that doesn't force you to choose between compromises.

The CEO™ Comprehensive Electronic Office system based on the industry's newest and most powerful 32-bit processor—the Data General ECLIPSE® MV/10000. It provides the power and performance of a mainframe at less than one third the price. And can bring down the cost of automating large organizations to under $7500 a workstation.

Our systems also protect your investment. Because they're compatible with both the mainframe world and the word processing world. (We provide SNA and X.25 communications, and an interface with most Wang word processing.) Which means you won't undermine your previous investment in either world for the sake of true, integrated office automation.

And CEO systems enjoy another advantage worth considering in an industry that's been more timely with new product announcements than with the new products themselves. Our systems exist, they're backed by a worldwide service and support network already in place, and they're available now.

All of which gives you two things you've been denied up until now:

A reasonable price.

And reason to believe you'll get what you've been promised.

For more information on the complete line of Data General office automation systems, write to Data General, CEO 30, 4400 Computer Dr., Westboro, MA 01580.

Data General

Comboard Front Ends Communicate via 3780

COLUMBUS, Ohio — Software Results Corp. has added to its Comboard series of front-end processors the ability to communicate via 3780 protocol to Digital Equipment Corp.'s VAX-11 and PDP-11 systems.

Comboard/3780 reportedly performs all of the remote job entry communications processing at speeds up to 56K bit/sec. The offloading of the processing from the DEC CPU reportedly allows the DEC computers to process user applications more efficiently.

Comboard/3780 routes files directly from the central system to end-user disk areas. The end user is automatically notified when the files are placed in his area, the vendor said.

Comboard/3780 also has the ability to act as a central system, a vendor spokesman said. This feature is said to allow the DEC systems to communicate with personal computers or any remote job entry station that has the ability to communicate via 3780 protocol.

Comboard/3780 ranges in price from $9,800 to $17,900. More information is available from the vendor at 2887 Silver Drive, Columbus, Ohio 43211.

High-Resolution Screen

AED Unveils Graphics Unit

SUNNYVALE, Calif. — A color graphics terminal said to have a high-resolution display screen was introduced by Advanced Electronics Design, Inc. (AED).

The AED 1024 is aimed at applications such as computer-aided design, manufacturing and engineering, process display, simulation, graphics art and medical display. It features a 1,024 pixel by 768 pixel screen, an antialiasing feature and 1,024 by eight virtual address space to define any screen display further. It also features 256 colors that can be displayed simultaneously and emulation of the Textronix, Inc. 4010 family of storage tube terminals.

The AED 1024 is said to be completely compatible with AED's 512 and 767 graphics terminals. It has eight memory planes, a green drafting grid and operates in a bit-map mode.

The AED 1024 color graphics terminal is available for $9,995, including base and keyboard. The high-resolution 19-in. monitor costs $3,300 from AED, 440 Potrero Ave., Sunnyvale, Calif. 94086.

Mux Speeds Off-Line Tests

SANTA MONICA, Calif. — Pioneer Research has unveiled the PR-1100 multiplexer, which reportedly speeds off-line testing of multiple drives by allowing up to four storage module device (SMD)-interface disk drives to be connected to a single Pioneer Research PM-4000 Qualifier.

The multiplexer is intended for burn-in, manufacturing test, incoming inspection and general-purpose applications. In a multiple drive test system, the PR-1100 is said to allow the user to set up a system of overlapping seeks that tests four drives in only 50% more time than a single drive.

To configure the system, the user connects the Qualifier cable to the PR-1100 multiplexer, then attaches the B cables from the multiplexer to each of the SMD drives. A cables are "daisychained" from the Qualifier to each of the drives.

Single-quantity price of the PR-1100 multiplexer is $1,000, the vendor said from 1745 Berkeley St., Santa Monica, Calif. 90404.

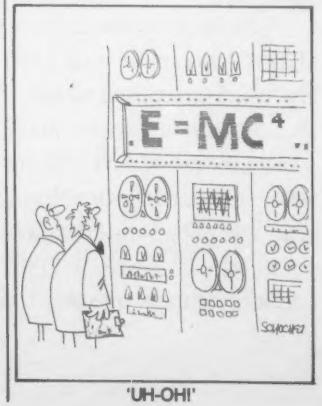
Digitech Cuts Monitors' Prices

RIDGEFIELD, Conn. — Digitech Industries, Inc. has announced price reductions for its Pacer 103 and Data Monitor 200.

Pacer, a passive data line monitor and interactive simulator, is now base-priced at $5,995, a reduction of 29% from its previous price of $8,500.

At $2,995, the Data Monitor 200 price has been reduced 40% from its previous level of $4,995.

Digitech Industries is headquartered at 66 Grove St., Ridgefield, Conn. 06877.



'UH-OH!'

Laminex puts security control in your hands.

That means "hands off" for everybody else in your organization. And that's a vital security feature in itself. No more keys to be lost, stolen or duplicated. No more locks to be silently picked. No more doors deliberately left open.

You or your security director hold a unique access card and code that programs your Laminex Access Control System. Programming is as easy as dialing a push-button telephone. And without this special card/code, your system and its memory can't be compromised.

Versatility is built in to your Laminex access cards. They can serve as a Photo ID Badge as well as providing for data collection and time and attendance.

What's more, you laminate and encode your own cards at your location. There are no delays. If a card is lost or stolen, you can delete the card number from the system's memory within seconds.

Here's another important feature. Your Laminex access cards are made with tough polyester. They resist cracking and deterioration even under adverse conditions.

And they protect you from routine card duplication – an excellent security feature in itself.

Conventional security measures are outdated.

Every morning's headlines underscore the fact that crime is increasing all across America. That's why management people like you are taking steps to strengthen security.

Your operation faces threats from within as well as outside. Access to your general environment is often as vital to control as access to internal areas. Locks and keys no longer have a fighting chance as security measures. You need a sophisticated solution to increasingly sophisticated threats.

Your Laminex Access Control System is a simple, economical, effective solution that translates computer technology into access control designed for your everyday use. It won't solve all your security problems. But when you combine it with other security practices, you'll have protection for life and property that's really extraordinary.

EXTRA-ORDINARY SECURITY

LAMINEX® ACCESS CONTROL SYSTEMS

Laminex Inc.
A Rexham Company

P.O. Box 240655 • Charlotte, NC 28224 • (800) 438-8850 • In North Carolina: (704) 588-4700

© 1982 Laminex, Inc.

Telenet.
Nobody's data network is easier to reach.

GTE Telenet, world's first packet-switched common carrier...

Just a local phone call from hundreds of American cities, in all 50 states, plus 40 foreign countries...

And able to handle virtually any host language, terminal speed, protocol or code conversion.

To reach our network, all it takes is either an X.25 software package or our on-site microprocessor-based interface equipment.

And, of course, a telephone.

You can count on the system's reliability. With its built-in redundancy, it not only senses when a node is out of action, but also routes data around the fault, automatically.

Finally, this whole network is available at a cost of just pennies a minute, plus a monthly charge for computer access. There's no capital investment.

For more on how easy our network is to reach, reach for your phone and call, toll-free, 800-835-3638. GTE Telenet, 8229 Boone Blvd., Vienna, VA 22180.

GTE Telenet GTE

TIRED OF PLAYING GAME

Sign up now for EMCE — The First Microcomputer Conference &

EMCE™

Executive Microcomputer Conference & Exposition

June 23-25, 1983

Sheraton Centre, New York, New York

If you want to learn how to select and use the microcomputing products and services that are revolutionizing business . . .

If you're tired of micro shows heavy on video games, but light on the serious applications you need to succeed . . .

EMCE is for you!

It's designed especially for executives who are responsible for the selection or use of micros in their organizations, executives who use micros as decision support tools, and business managers who employ (or want to employ) micros to manage their businesses.

The Conference Program

Thursday, June 23 & Friday, June 24

The Thursday and Friday conference program is divided into four major "tracks," but you are not required to sign up for a particular group of sessions. You may select the sessions you need from any of the 48 sessions available and create a conference program designed to suit your unique information needs. You may even choose to attend one day instead of two if you want. A detailed agenda will be sent to you prior to the conference for your advance planning, so you don't waste a minute!

Special General Session for Thursday Attendees:

The Revolt of the Masses: Micros and the Changing Role of DP. *(5:00-6:00 p.m.)*
Dr. Michael Hammer, President, Hammer & Company

1. Personal Computing in a Corporate Environment

For Executives in large corporations who are involved in using micros in distributed data processing or as standalone executive workstations, the EMCE conference program includes:

Keynote: Increasing Corporate Productivity via the Personal Computer *(Thurs., 9:00-10:00 a.m.)*
Mayford Roark, Executive Director of Systems, Ford Motor Company

The Executive/Professional Workstation *(Thurs., 10:00-11:00 a.m.)*
Evelyn Wilk, Consultant, Arthur Andersen & Co.

DDP with Microcomputers *(Thurs., 2:00-3:30 p.m.)*
Moderator: Jerrold Eisen, President, Office Sciences International
Panelists: Phil Dixon, MIS Manager, Apple Computer; Robert A. Miller, Special Assistant to the Deputy Secretary of Treasury, U.S. Treasury Department

The Information Resource Center *(Friday, 3:45-5:15 p.m.)*
Moderator: Thomas Kosnick, Researcher, Stanford Business School;
Panelist: Alan Gross, Director of Systems, International Paper Company

The Role of Apple and IBM in Corporate Computing *(Friday, 3:45-5:00 p.m.)*
Moderator: David Bunnell, Publisher, "PC World"

New Issues of Confidentiality and Security in Organizational Information Processing *(Friday, 9:00-10:00 a.m.)*
Professor Alan F. Westin, Columbia University

Personal Computer Acquisition and Implementation Strategies *(Friday, 10:00-11:00 a.m.)*
Don L. Eddy, Principal, Office Futures Now, Inc.

Compatible Systems and Software for the IBM PC *(Friday, 2:00-3:30 p.m.)*
Moderator: Steve Cook, Technical Editor, "PC World"
Panelists: Chris Larson, Product Marketing Manager, MS/DOS, MicroSoft; Steve Flannigan, VP Software, Compaq Computer Corp.

2. Introduction to Microcomputing and its Applications

For Executives who are concerned with the selection and use of microcomputers primarily in smaller businesses, the EMCE conference highlights:

Keynote: The Personal Computer: The Mouse that Roared! *(Thurs., 9:00-10:00 a.m.)*
Lew Kornfeld, Director, Tandy Corporation

How to Buy a Personal Computer *(Thurs., 10:00-11:00 a.m.)*
Lawrence Govoni, Director, Govoni Microcomputer Training School, Boston, MA

Spread Sheet/Financial Applications *(Thurs., 2:00-3:30 p.m.)*
Moderator: Hannah Blank, Vice President-MIS, Chase Manhattan Bank
Panelists: Seneel Kelkar, Mktg. Mgr., Standalone Products, VisiCorp; Russell Warner, Product Mktg. Mgr., End user Products, MicroSoft

New and Future Trends in Personal Computing *(Thurs., 3:45-5:00 p.m.)*
John C. Dvorak, Editor, "InfoWorld"

Word Processing Packages for Personal Computers *(Friday, 9:00-10:00 a.m.)*
Susan Harmon, President, Transitions

DBMS on Personal Computers *(Friday, 10:00-11:00 a.m.)*
Adam Green, President, SoftwareBanc

A Look at Integrated Software Packages *(Friday, 2:00- 3:30 p.m.)*
Moderator: Dan Coursey, Sr. Market Analyst, International Data Corporation
Panelists: Chris Morgan, VP, Communications, Lotus Development Corp.; Brian Fischer, Sr. Vice President, Context Management Corp.; Roy Folk, OEM Customer Mktg. Mgr., VisiCorp

Panel: Executive Personal Computer Success *(Friday, 3:45-5:15 p.m.)*
Moderator: Alan Sneider, Partner, Laventhol & Horwath

3. Technological Developments in Personal Computing

For Executives who wish to keep up with changing microcomputer technologies in mass storage, business graphics, operating systems, and more, the EMCE conference highlights:

Keynote: The Future of Personal Computer Software for Business *(Thurs., 9:00-10:00 a.m.)*
Dan Fylstra, Chairman, VisiCorp

What's New in Peripherals *(Thurs., 10:00-11:00 a.m.)*
Peter Burgess, President, Burgess Management Associates

Developments in Personal Computer Business Graphics *(Thurs., 2:00-3:30 p.m.)*
Moderator: Dave Needle, Sr. Writer, "InfoWorld"

Developments in Mass Storage Capabilities *(Thurs., 3:45-5:00 p.m.)*
Moderator: Will Zachmann, VP, Office of Technology Assessment, International Data Corporation

Utilities *(Friday, 10:00-11:00 a.m.)*
Haines Gaffner, President, LINK

Popular Programming Languages *(Friday, 10:00-11:00 a.m.)*
Gordon Eubanks, Vice President, Commercial Systems Division, Digital Research, Inc.

Operating System Selection: 8 to 16 Bit *(Friday, 2:00- 3:30 p.m.)*
Moderator: Maggie Canon, Editor-in-Chief, "InfoWorld"
Panelists: Gordon Eubanks, VP-Commercial Systems, DRI; Jean Yates, President, Yates Ventures; Mark Ursino, OS Marketing Mgr., Microsoft Inc.; Natalie Shuttleworth, Manager of OS Mktg., Apple Computer

Developments in Networking *(Friday, 3:45-5:15 p.m.)*
Moderator: Will Zachmann, VP, Office of Technology Assessment, International Data Corporation
Panelists: Mark Stahlman, Dir., Mktg. Development, General Instrument Corp.; Art Simon, Director of Mktg., Commercial Services, Warner-Amex Cable Communications Inc.

4. Microcomputer Market Opportunities

For Entrepreneurs, Dealers, Distributors and Systems Houses, we'll offer sales and venture capital strategies you won't want to miss. Session highlights include:

Keynote: Retail Opportunities in the Personal Computer Marketplace *(Thurs., 9:00-10:00 a.m.)*
James Finke, President, Internetworx, Inc.

Software Packaging and Distribution *(Thurs., 10:00-11:00 a.m.)*
Will Luden, Director of Marketing and Retail Communications, Micropro International

Raising Venture Capital for Software and R&D *(Thurs., 2:00-3:30 p.m.)*
Moderator: Jim Furneaux, Partner, L.F. Rothschild, Unterberg, & Towbin

Legal Issues for the Retail Distributor *(Thurs., 3:45-5:00 p.m.)*
Walter Klasson, Brown, Raysman & Millstein

Market Update: Competition from Japan *(Friday, 10:00- 11:00 a.m.)*
Robert C. Wood, President, Robert Chapman Wood Company

Successful Training Strategies for Vendors and End Users *(Friday, 2:00-3:30 p.m.)*
Sue Cornwall, NEC Information Systems; Stephanie Rosenbaum, President, Tec-Ed

Delivering Good Maintenance, Service & Support *(Friday, 3:45-5:15 p.m.)*
John Harnett, Director of Planning and Development, TRW Customer Service Division

Selling the Corporate Account: Problems & Pitfalls *(Friday, 9:00-10:00 a.m.)*

Special Program for Educators

Saturday, June 25

Co-sponsored by T.H.E. Journal

For Educators and Administrators, EMCE will hold a special seminar on Saturday, June 25th entitled Microcomputers in Education which includes the following sessions designed to suit the unique needs of education:

Keynote: Computer Assisted Instruction in Education *(8:30-9:30 a.m.)*
Dr. Sylvia Charp, Editor-in-Chief, T.H.E. Journal

S AT COMPUTER SHOWS?

Exposition that's as serious about personal computing as you are.

EMCE gives you a complete conference program and exhibition:

- 48 conference sessions
- 3 days of exhibitions
- Hardware/Software selection
- Micros in smaller businesses
- Financial applications
- Special program of personalized instruction
- Future trends
- And much more!

The Executive Microcomputer Conference and Exposition (EMCE) is sponsored by the Conference Management Group of CW Communications/Inc., publishers of *Computerworld, InfoWorld, ISO WORLD,* and *PC World.*

Computer Funding and Acquisition *(9:30-10:30 a.m.)*
Ann Cullather, Education Legislation & Technology, Washington, D.C.

Logo: An Educational Language *(10:45-11:45 a.m.)*
Richard Carter, Director, Educational Laboratories, Lesley College

Teacher Training *(1:15-2:15 p.m.)*
Kevin Dwyer, Training Director, Unicom

Administrative Applications for Educational Institutions *(2:15-3:15 p.m.)*
Patricia Carter, Computer Applications Specialist, MASBO CoOp

Educational Computing at Home *(3:30-5:00 p.m.)*
Moderator: Scott Mace, Sr. Editor, "InfoWorld"
Panelists: Ken Komoski, Executive Director, Educational Products Information Exchange Institute; Richard Robinson, President, Scholastic Inc.

Special Hands-On Workshop

Thursday, June 23 & Friday, June 24

In addition to the main conference program, EMCE will offer a two-day Executive Microcomputer Workshop for those professionals who wish to get hands-on experience with an Apple or IBM Personal Computer. The workshop will focus on four specific applications: spreadsheet analysis using VISICALC, data base management using dBase II, graphics and communications. An in-class network will be set up to demonstrate the communications capabilities of personal computers. The two-day seminar will run concurrently with the EMCE Conference program and will include admission to the exhibits and special feature sessions on Saturday, June 25.

The Executive Microcomputer Workshop will be sponsored by the *Personal Computer Learning Center of New York City* and will be held at the Center, located at 1120 Avenue of the Americas, on Thursday and Friday June 23 & 24th. **Enrollment is limited,** so please register early with your choice of hands-on using either an Apple or an IBM PC.

FREE Feature Sessions for All Saturday Attendees

FREE Special Feature Sessions for all Saturday EMCE attendees (exhibit or conference) will be held Saturday, June 25 from 9:00-1:00 p.m. The sessions will focus on professional applications for micros and starting your own home based business or office, and will also discuss the personal computer's impact on family life, kids and recreation.

1. The Home Office — Basics

Getting Started — Hardware & Where to Buy *(9:00-10:00 a.m.)*
Daniel P. Coursey, Senior Market Analyst, International Data Corp.

Software Applications — Selection & Uses *(10:00-11:00 a.m.)*
David Lamb, Sr. Research Associate, LINK

Setup & The First Six Months *(11:00 a.m.-12:00 noon)*
Paul Conover, President, Praxsys Communications

Programming Languages *(12:00 noon-1:00 p.m.)*
A. Richard Miller, Partner, Miller Microcomputer Services

2. Professional Applications

A Look at Spread Sheet Applications *(9:00-10:00 a.m.)*
Ralph Wagner, President, Microsource/Financial, Inc.

Investment Management Applications for Micro's *(10:00-11:00 a.m.)*
Jon Zonderman, Contributing Editor, "Computer Update"

On-line Data Base Systems *(11:00 a.m.-12:00 noon)*
Steven Sieck, Dir., Electronic Information Program, LINK

Word Processing Packages for Microcomputers *(12:00 noon-1:00 p.m.)*
Ronnie Marshak, Contributing Editor, "The Seybold Report"

3. Home/Family Microworld

Household Management *(9:00-10:00 a.m.)*

Micros for Organizations & Groups *(10:00-11:00 a.m.)*

Home Micro-Based Businesses *(11:00 a.m. - 12:00 noon)*
A. Richard Miller, Partner, Miller Microcomputer Services

Micros: Impact on Family Life, Kids & Recreation *(12:00 noon-1:00 p.m.)*
Dan Oehlsen, Executive Producer, Children's Computer Workshop

Over 100 Professional Exhibits at EMCE

EMCE exhibits offer the latest in business-oriented hardware, software, peripherals, systems, accessories and resources from a wide selection of suppliers including companies like IBM, Digital Equipment Corporation, BASF Systems Corp., Computerland, Addison Wesley, GRID Systems, Micro Systems International, Key Software and Victor Electronics . . . to name just a few. EMCE's designed for you to see, touch and learn what you need to know about micros. **Your conference registration includes complete, 3-day exposition attendance.** Or you can sign up for the exhibits only. If you register in advance, using the form in this ad, you get two bonuses:

1. **Early admission** — only conference registrants and advanced registrants will be admitted to the hall between 11 a.m. and NOON on Thursday and Friday.
2. **$5.00 discount** on admission price.

Register for EMCE now! The Sheraton Centre in New York City is the place; June 23-25, 1983 are the dates. Exposition hours: 11-7, Thursday and Friday; 10-6, Saturday. For more information on the conference and exposition, dial 1-800-225-4698 (In Massachusetts, 617-879-0700) and ask for Louise Myerow.

EMCE™
Executive Microcomputer Conference & Exposition

Conference Registration

Includes Complete Exhibit Admission with 11:00 a.m. early admission privilege

- ☐ Full Two-Day Conference Registration* — $295
- ☐ One Day Conference Registration — $195
  - ☐ Thurs. only ☐ Friday only
- ☐ Executive Microcomputer Workshop* Thurs. and Friday — $595
  Choose one: ☐ Apple ☐ IBM PC
- ☐ Micros in Education Sat. June 25 — $ 95

*Includes Saturday Special Features Programs

Conference registrants only may register by phone: Call 800-225-4698. In Mass. call collect 617-879-0700 and ask for Louise Myerow.
Registrations Cancelled later than June 15 are subject to a $50.00 service charge. Registration may be transferred at no charge.

EMCE — Sheraton Centre, New York City June 23-25, 1983 EMC3

- ☐ YES! Register me for EMCE (fill out attached conference form)
- ☐ YES! Register me for EMCE Exhibit Only (fill out attached exhibit form)
- ☐ Send Information Only!

Name & Title _____
Company _____
Street/P.O. Box _____
City _____ State _____ Zip Code _____
Telephone ( ) _____

TOTAL $_____ Charge to: ☐ American Express ☐ Check Enclosed ☐ VISA ☐ Bill my company (conference only) ☐ MasterCard ☐ Bill me (conference only)

Exp. date _____ Acct. # _____
Signature _____

Send Form and Payment to: EMCE, Conference Management Group, Box 880, Framingham, MA 01701

Exhibit Only Registration

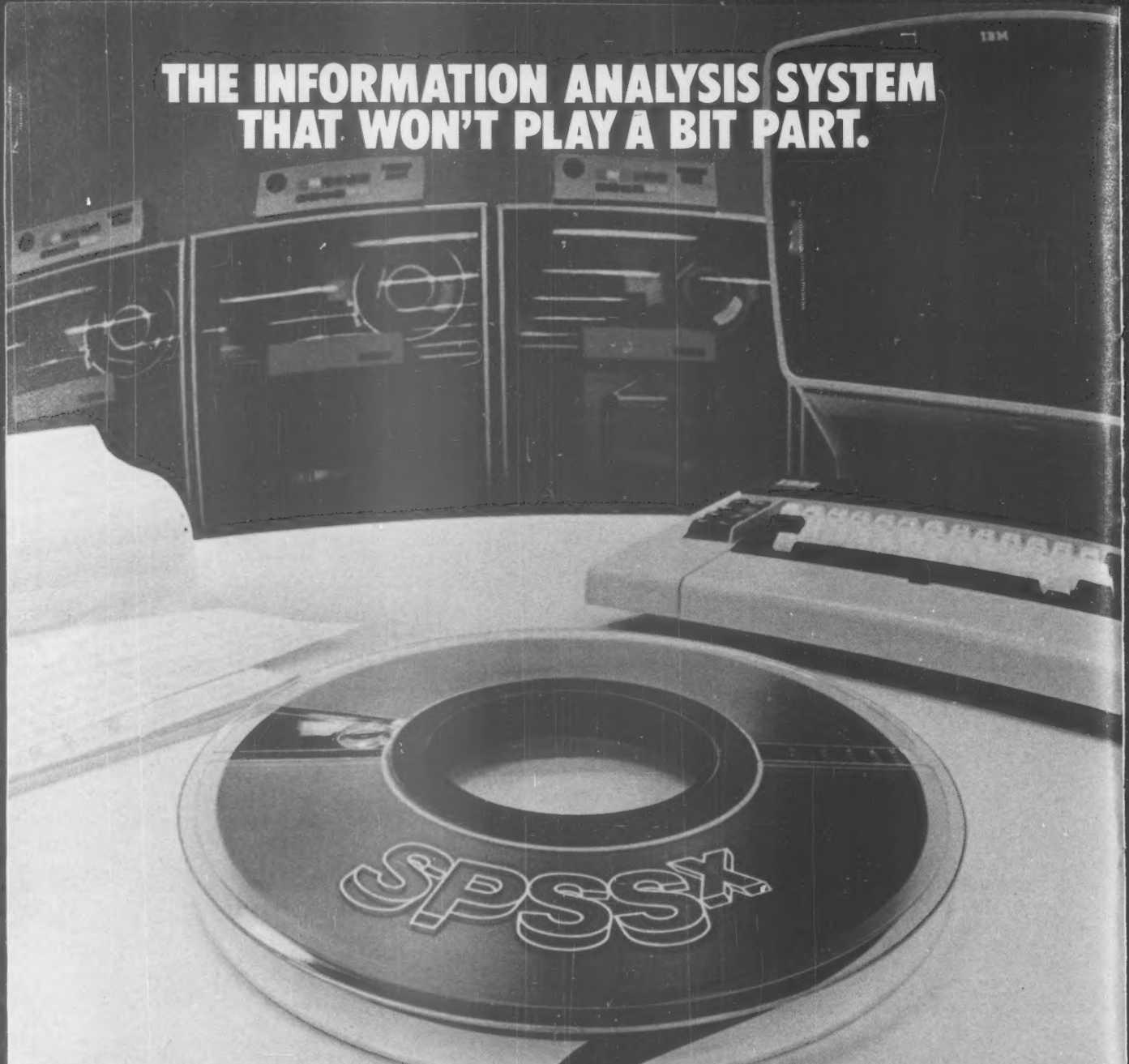
SAVE $5 by Registering in Advance and Get Early Admission. (Only Advance registrants will be allowed into show between 11:00 a.m. and NOON on Thursday and Friday)

- ☐ Advance *Pre-Paid 3 day exhibit* registration $20 ($25 at door)
- ☐ Advance *Pre-Paid 1 day exhibit* registration $10 ($15 at door)
  ☐ Thurs. ☐ Friday ☐ Saturday

3-Day Exhibit Registration Includes Special Feature Sessions on Saturday, June 25th from 9:00 a.m. to 1:00 p.m.

You must enclose your check or charge information. We cannot bill you or take your exhibit registration over the phone. Exhibit registration is non-refundable.

THE INFORMATION ANALYSIS SYSTEM THAT WON'T PLAY A BIT PART.



Some software systems are like walk-on actors; they're usually kept standing offstage. But not SPSS^{X}.™ Because SPSS^{X} offers everything you need to organize, summarize and display information in scores of productive ways. It's a totally new Information Analysis System which we've designed with the most advanced statistical capabilities yet. To play a leading role in any DP or Information Center environment.

Want to enhance efficiency? With minimal training, anyone in your organization can start using SPSS^{X} to get the critical information they're after. In the time it takes users to explain a problem to a programmer, they could be obtaining answers and putting them to work. Permitting the programmer to devote more time to other applications.

Need advanced file management capabilities? SPSS^{X} lets you define and combine data from any number of files, regardless of complexity or structure.

Searching for sophisticated statistics? Over 50 major statistical procedures are at your command, from simple table and plot procedures for novice users to state-of-the-art multivariate techniques for more sophisticated users.

Interested in evaluating computer performance? SPSS^{X} gives you the power to read and analyze SMF and RMF type data, and to turn this system performance information into concise, understandable reports.

These are just a few of the many capabilities that make the SPSS^{X} Information Analysis System such an incredibly productive performer. For more information, call or write for our descriptive brochure today.

© Copyright 1983, SPSS Inc.

PRODUCTIVITY RAISED TO THE HIGHEST POWER™

SPSS Inc. 444 N. Michigan Ave. Chicago, Illinois 60611 (312) 329-2400

SPSS^{X} currently runs on IBM OS, CMS and Digital VAX™ systems. Conversions will soon be available for IBM DOS, DEC 10 and 20, PRIME, Univac 1100, Data General MV 8000 series and other minis and mainframes.

Photographed at IBM Data Center, Chicago, IL

Upgradable From Eight Users

Convergent Unveils 128-User Megaframe

By Bob Johnson
CW New York Bureau

NEW YORK — A computer system which is said to be field-upgradable and capable of supporting a range of computers from an eight-user minicomputer to a 128-user mainframe was introduced by Convergent Technologies, Inc. here last week. Called the Megaframe, the product uses a multiprocessor architecture which in its high-end configuration can handle up to 36 processors, 128 users, 24M bytes of error-correcting random-access memory (RAM) and 21.6G bytes of external disk storage, according to the company.

Megaframe uses Convergent's real-time Ctos operating system and a distributed virtual memory version of Unix in order to share system resources transparently to the user or application. Unix-based languages supported are Cobol, a Basic compiler and interpreter, full Fortran 77, Pascal and C. Ctos supports real-time software including communications programs and CT-Isam for multiuser access to common information.

Users of the product can mix and match dumb RS-232C terminals with Convergent workstations and Model PT terminals, the company said.

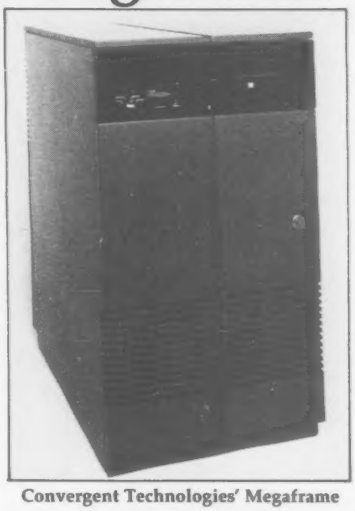
Up to 36 board-level processing units working in parallel on a high-speed 32-bit bus can be linked by the system, Convergent noted. Systems can grow by plugging additional processors into each system enclosure; when all six card slots in the first enclosure are full, expansion enclosures are added. The maximum six-enclosure system offers 36 card slots and supports up to 1.15G bytes of internal disk storage and 21.6G bytes external small modular device storage.

A spokesman for Convergent said that the Megaframe's architecture eliminates traditional shared-logic bottlenecks by letting users configure a system with the appropriate number of processors of each type. The right combination of types depends on whether the application mix is CPU-intensive, terminal-intensive or I/O-intensive, he added.

"Each of up to 36 processors is running its own operating system, but all are executing in parallel. At the same time, the application processor is executing programs and the file, terminal and cluster processors are all handling their respective functions."

Each processor in the Megaframe contains 0.25M- to 4.0M bytes of RAM and its

(Continued on Page 122)



Convergent Technologies' Megaframe

Microfilm System Flexible Solution For Claims Group

OLYMPIA, Wash. — Despite an ever-increasing work load, the state of Washington's Employment Security Department has been able to handle more claims with 19 fewer people and 3300 fewer square feet by implementing an efficient microfilm filing and retrieval system.

According to Deputy Assistant Commissioner Clinton Petty, this translates into savings of more than $150,000 a year, which he said would have been spent on staff additions had the department not installed the Kodak Corp. Oracle equipment for two of its largest data files.

"We could have partly justified the microfilm equipment just on the basis of more than 3,000 square feet of space saved — valued at $25,000 annually," Petty said. But once the system was installed, the microfilm's flexibility proved most valuable to the state, compared with its old paper filing system.

"About the only nonroutine thing one can do with a folder of paper is lose it,"

(Continued on Page 122)

'Hidden Computer' Takes to Factory Floor

By Dennis Livingston
Special to CW‡

The control of manufacturing operations has increasingly come under the domain of microprocessor-driven equipment. While some of this equipment takes the form of familiar micro, mini and mainframe computers, one of the more important devices used for shop-floor control does not resemble computers at all. This is the programmable controller, a hidden computer which has helped spread the influence of the ubiquitous chip from the executive suite to the factory.

A controller is used to monitor and direct machine manipulations and industrial processes. Tasks carried out by machines under control may include shaping and cutting metal, routing parts along transfer lines, assembling parts at workstations, storing and retrieving materials, packaging goods, regulating the flow of liquids and gases and managing energy use.

For most of the 20th century, the remote control of machines engaged in such activities has been achieved through the use of devices custom-designed from electro-mechanical components such as relays, timers and steppers. In assembling this type of controller, the first step is to establish the sequence of events to be performed by the machine or process being controlled.

For example, a machine in an automotive or airplane factory might have the responsibility for acquiring a part, turning it, cutting it and placing it on an assembly line. This sequence is translated into a set of visual symbols known as ladder logic. Each "rung" on the ladder represents a particular logic function, such as timing and counting, to be undertaken by the controller.

Using the ladder diagram, an engineer then connects the required parts to form the controller. Streaming out from one side of the controller is a complex set of wires linking the device to the components needed to manage the machine, including valves, motors, gates, switches, sensors and the like. Snaking into the other side of the controller is an-

(Continued on Page 124)

UNITRONIX

PDP 11/23 SYSTEMS with 256kB* memory, 160 Mbyte winchester, std. 45 ips 9-track tape backup, VT101 CRT, LA120 printer. Runs RSX11, RSTS, TSX OR UNIX. $32,000 *up to 4MB avail.

TERMINALS
VT100 LA12
VT101 LA34
VT102 LA50
VT125 LA100
VT131 LA120

CPUs
PDP 11/23, 11/44 & VAX

INTERFACES
MODEMS

COMPLETE DATA SYSTEMS with standard and custom software

VT, LA, LSI, PDP, VAX are trademarks of Digital Equipment Corporation

SPECIAL
LSI-11 MODULES, PERSONAL COMPUTERS

UNITRONIX CORPORATION
197 Meister Ave. Somerville, NJ 08876
TELEX: 833184

CALL FOR LATEST PRICES
(201) 231-9400

AUTHORIZED digital TERMINALS DISTRIBUTOR

ARE YOU SUFFERING FROM PERIPHERAL SCHIZOPHRENIA?

Having multiple suppliers for your data communications peripherals can pull your mind in all different directions.

You have to worry about service, about cost, about making sure you have the equipment and system you really *need*—now and in the future.

It's enough to boggle your mind.

At General Electric, we think our single-minded approach offers a higher degree of sanity.

Ah, simplicity.

Instead of multiple worries, you have one simple answer: General Electric. We begin by analyzing your needs—and likely growth pattern. Then, we help you decide on the distributive processing network system that's best for *you*.

And, since we don't have to promote a particular line or group, we'll help you build your system with components from one of the most comprehensive multi-manufacturer product selections in the business.

A sane approach to service.

You make one phone call. We have a nation-wide network of over 60 service centers, including one near you.

Each not only has the service *people* you need, but also stocks a large selection of replacement parts, too—which usually adds up to *same day* response. In fact, we even carry the little stuff—like ribbon, paper, cassettes and discs—so you don't waste valuable space.

How our lease can cost you less.

All leases help to conserve capital and credit, eliminate obsolescence and hedge against inflation.

But with GE's service network *behind* the lease, you can help minimize *downtime*—which just could be the biggest cost-saving of all.

Help is on the way.

Shouldn't you find out more? Then call or write us now. 800-528-6050, Extension 406. (In Arizona, call 800-352-0458, Extension 406.)
General Electric Company
Communication Equipment Leasing
Building 4, Room 210
Schenectady, New York 12345

GENERAL ELECTRIC

Attached Processor Ups Power of DEC Systems

HUNTINGTON BEACH, Calif. — Ranyan Computer Enhancement Systems has announced an attached processor designed to increase the computing power of the Digital Equipment Corp. LSI-11, PDP-11 and VAX-11 series processors.

Called the APS-1, the unit operates as a slave to the main processor. The main processor assigns tasks according to its own needs. Multiple APS-1 systems may be attached to a single primary CPU and all interaction between the host and slave processors is controlled transparently through sharing of the host main memory, the vendor said.

The attached processor can be assigned to a variety of calculations or I/O processes. For example, the host processor can start or stop the attached processor, download a task image or pick up task results through shared memory.

The APS-1 consists of Ranyan's · peripheral processor link and a DEC LSI-11/23S processor. The unit is connected to the host processor via a 50-conductor ribbon cable. The attached processor may have between 64K and 256K bytes of dedicated memory for calculations and I/O processing. The attached processor can share as much as 256K bytes of the host processor's memory for data transfer, the vendor said.

APS-1 systems cost from $7,400, the vendor said from 15239 Springdale St., Huntington Beach, Calif. 92649.

Three-Pen Plotter Out for Micro Users

KENT, Wash. — Mannesmann Tally Corp. has introduced a high-performance three-pen plotter for personal computer users.

At the same time, the vendor announced an immediate 25% price cut on its Model MT160 printer for personal computers.

The newly developed three-pen plotter, called Pixy, can reportedly operate with the IBM Personal Computer, the Apple Computer, Inc. Apple II and IIe and various other computers used in business applications. The product can produce charts, graphs, histograms and other forms of graphics displays on standard 8½-in. by 11-in. paper or on transparencies at speeds of up to 200 mm/sec, according to the vendor.

Its memory includes a 96-char. Ascii set, Greek, scientific characters and nine international language sets, the vendor added.

The Pixy plotter with a parallel interface sells for $795.

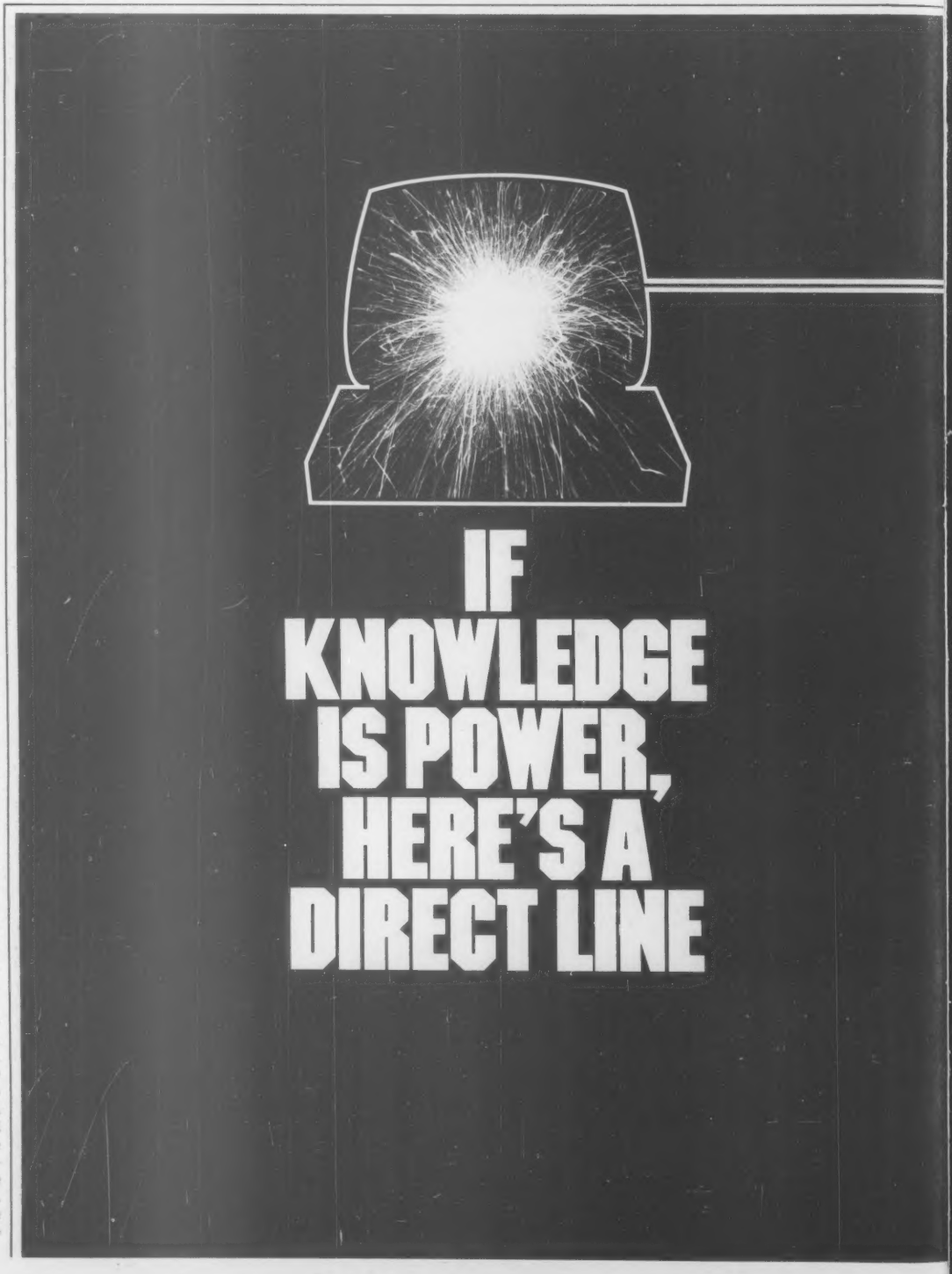
The vendor is located at 8301 S. 180th St., Kent, Wash. 98032.

SKS Unveils Versions Of Micros

COLUMBUS, Ohio — SKS Computers, Inc. has announced a portable microcomputer which is available in both 8- and 16-bit versions.

Called the SKS 2502 Nano, the 8-bit version is compatible with SKS' line of desktop systems. The unit is equipped with dual 5¼-in. 400K-byte minifloppy disk drives, a Zilog, Inc. Z80A microprocessor with 80K bytes of random-access memory (RAM), an integrated CRT, detached keyboard and two RS-232C serial ports. The unit comes with Digital Research, Inc.'s CP/M operating system and costs $2,495.

The basic 2502 Nano system can also be equipped with a 16-bit Intel Corp. 80186 microprocessor the company plans to make compatible with IBM's Personal Computer. Also included with the 16-bit version are 128K bytes of RAM, one parallel port or a 5¼-in. 5M-byte Winchester hard disk drive. The unit costs $3,295, the vendor said from 4091 Leap Road, Hilliard, Ohio 43026.



Altos Micros Get Expanded Memory Capacity

SAN JOSE, Calif. — Altos Computer Systems, Inc. has announced the addition of an expanded memory capacity configuration to its 586 family of 16-bit networking multiuser microcomputers.

The 586-14 has 5¼-in. hard-disk capacity or roughly 40M bytes and can reportedly be expanded to 80M bytes, the vendor said. The 586 family is based on Intel Corp.'s 10-MHz version of the 8086 microprocessor. These systems run the Microsoft, Inc. Xenix operating system, Altos added.

The system will support both Altos-Net and Ethernet local-area networking, plus X.25, IBM's 3270, 3780 and Systems Network Architecture protocols. Main memory is said to contain 512K bytes, expandable to 1M byte. Other features include intelligent hard disk and tape controller, memory management, six serial ports and battery-backed clock/calendar, the vendor said.

Pricing on this product line starts at $7,990. Further details may be obtained from Altos at 2641 Orchard Pkwy., San Jose, Calif. 95134.

Personal Business Systems Debut

SAN JOSE, Calif. — A newly developed line of 16-bit personal business systems has been unveiled here by Durango Systems, Inc.

Named Poppy, the five offerings are designed to meet the nontechnical business user's requirements for one to 12 workstations in a multiuser, multitasking environment, the vendor reported. The choice of software operating systems includes Microsoft, Inc.'s MS-DOS and Xenix, as well as Digital Research, Inc.'s CP/M 86. Poppy customers will also have immediate access to generic and applications software developed for business by Durango, the vendor added.

A basic Poppy system consisting of a 16-bit microprocessor with 128K bytes of random-access memory, two 800K-byte, 5¼-in. floppy disk drives, CRT screen, detachable keyboard and MS-DOS, is priced at $4,395. Further details are available from Durango at 3003 N. First St., San Jose, Calif. 95134.

Now the only thing standing between you and low cost, high quality computer-based training is your telephone

800-323-3682*

Announcing the DELTAK/PHOENIX Presentation System. FREE with DELTAK CBT courseware.

In a field where technology changes in the blink of an eye, keeping pace has always been a problem. Falling behind meant falling victim to a dangerous information gap. Computer-based training was supposed to change all that. But early CBT presentation systems were slow and ineffective. Not enough quality courseware was available. And gearing up for CBT required a costly corporate commitment. So corporate access to this powerful new training tool was limited.

Then two leaders in CBT—DELTAK, the world's leading producer of multimedia and computer-based courseware, and Goal Systems International, creators of PHOENIX, the world's most comprehensive CBT system—joined forces to bring you the latest, most direct line to knowledge. The DELTAK/PHOENIX Presentation System now comes *free* with DELTAK CBT courseware.

DELTAK CBT courseware delivers.

This powerful system gives you immediate access to a wide variety of DELTAK CBT courseware. Each course is designed to deliver maximum training results with a minimum manpower investment. DELTAK courseware is:

Cost Effective. Research shows students using CBT learn about 30% faster than with conventional training methods. Interactive instruction increases the amount of information retained by the student.

Consistent. Computer-based instruction assures a uniform level of skills mastery throughout your organization.

Accessible. Employee training is as close as the nearest terminal, and soon the nearest IBM PC.

User Paced. With DELTAK courseware, every student learns at his or her own speed.

User Comfortable. DELTAK courseware is easy to use, easy to understand and easy to work with.

Courseware for the Information Center/End User audience available in 1983 includes: SAS, Focus, ADRS, ISPF and EASYTRIEVE™. 21 courses in all.

Courseware for the MIS Professional audience available in 1983 includes: VM/SP CMS, CICS, IMS/VS-MTO, VTAME and SPF/MVS. 48 courses in all.

THIS ISN'T THE END OF THE LINE. Courses under development for availability in 1984 include: RAMIS, Mark IV/Answer 2, Structured COBOL, Systems Development, MVS/SP JCL and MVS JES2. Over 175 courses will be offered.

The PHOENIX Presentation System delivers.

It's a state-of-the-art software package that lets you use an IBM mainframe or personal computer—and existing terminals—to present DELTAK CBT courseware. So people in *any* office throughout your computer network can efficiently get the critical training they need. PHOENIX makes sense because it's:

Consistent. The system guarantees uniform, standardized training from person to person and eliminates variations in the quality of instruction.

Cost Effective. Since PHOENIX is free with DELTAK courseware, you can take advantage of the economies afforded by CBT without making a major investment.

Resource Efficient. CPU cycles and disk access are reduced by as much as 70%—compared to that needed by IBM's IIPS.

Easy to Install. The system's up and running in less than 2 hours.

Accountable. Class summaries, student performance studies and item analysis reports make it easy to monitor learning skills.

FREE. PHOENIX has proven itself to be a valuable tool for efficient, effective training... and it's free with DELTAK courseware.

Another reason to dial our line.

The DELTAK/PHOENIX system is also backed by the highly rated PHOENIX Technical Support Team and the DELTAK Software Response Center—a first in the training industry. This assures the ongoing success of your CBT program.

Call us direct.

Make the connection with your direct line to knowledge. Call our toll-free number today.

*Inside Illinois call (312) 369-3000.

DELTAK

DELTAK, inc.
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000

Goal Systems

5455 North High Street, Columbus, Ohio 43214,
(614) 888-1775 Inside Ohio, 1-800-848-4640 Outside Ohio

© Copyright 1983, DELTAK/Goal Systems International

Plus 80 Prices Get Reduced

PARSIPPANY, N.J. — MDS Trivex, a division of Mohawk Data Sciences Co., has announced new pricing for the Plus 80 family of IBM 3278 plug-compatible devices.

The purchase price of the vendor's 8074-1C controller has been reduced to $4,950, representing a savings of 60%. The 8078-02 large character display and keyboard is now priced at $1,500, the vendor said. The 8087-02 180 char./sec printer now costs $1,500. Monthly lease prices have also been lowered, according to the vendor.

Further details on price cuts can be obtained from MDS headquarters at Seven Century Drive, Parsippany, N.J. 07054.

Printer Out For Versator

MENLO PARK, Calif. — Centurion Industries, Inc. has announced a serial dot-matrix line printer for use with the Versator Educational Computer.

Versaprinter is said to provide hard-copy printouts of student scores and diagnostic information transmitted from Versator. It is also said to incorporate a network distribution center permitting up to ten Versators to be networked for group learning or testing purposes when each Versator contains the same software.

The Versaprinter is priced at $419. More information is available from the vendor, which is located at 167 Constitution Drive, Menlo Park, Calif. 94025.

Microfilm Speeds Up Employment Claims

(Continued from Page 117)
Petty said. "Microfilm files, however, can be organized and coded for retrieval in a number of creative ways. This flexibility allows more users to take advantage of microfilm to obtain the information they need to do their jobs."

Petty explained how unemployment benefit claims records were frequently misfiled by the department. Now all records are always available for instant access. Tax reports in the tax division are also microfilmed, enabling rapid retrieval of any document image among the 140,000 filmed each quarter, he said.

"We were experiencing increasing problems with lack of space for new files, lengthy lookup times and poor file integrity," remarked Tax Records Manager Gary Hughes. "With hundreds of thousands of documents on open shelves, misfiles meant that 100 or more documents were lost each month."

Thus the department purchased three Kodak Oracle microfilmers and three Kodak Oracle microimage terminals in August 1979.

"We like the capability of devising our own coding for image retrieval," Hughes commented. "The Oracle equipment allowed us to design a system that would require only the amount of sorting we felt was desirable prior to microfilming."

Hughes is pleased that his operators all exceed the normal standards for input speeds on the Oracle microfilmers by a "healthy margin." During the average daily eight-hour shift, each of the three microfilmers microfilms between 7,000 and 8,000 documents. The department could convert more files to microfilm without additional investment, Hughes added, by simply expanding the current single microfilming shift to a two- or three-shift operation.

Another benefit of the system has been improved circulation resulting from the elimination of the old paper-laden filing shelves, Hughes asserted.

"We're able to staff much more efficiently," Petty added. "Before, we had to add many temporary employees to meet the quarterly peaks in work load."

Now, Petty concluded, documents are always in file and readily available for access.

Convergent Unveils Megaframe System

(Continued from Page 117)
own copy of operating system software. A given processor handles one of four specialized functions:

- The applications processor runs all applications programs under a virtual memory version of Unix. Up to 16 such processors can be installed, making possible performance of 8 million instructions per second.
- The file processor, functionally equivalent to a back-end data base processor, is devoted to executing the file system and file-oriented programs. It also handles disk access requests from other processors and controls up to four Winchester storage devices: three 5¼-in., 50M-byte drives and a removable 5M-byte cartridge in the master enclosure, as well as four more drives in each expansion enclosure.
- The cluster processor, which acts as a front-end communications processor, controls two multidrop RS-422 ports and can transmit at 307K bit/sec. It also supports three RS-232 ports and a parallel printer port.
- The terminal processor also acts like a front-end communications processor and has 10 serial RS-232 lines each operating at up to 19.2K bit/sec. It can support any device with a standard RS-232 interface.

Both the terminal and cluster processors support a variety of communications protocols including IBM's System Network Architecture, 3270, X.25, bisynchronous 3270 and 2780/3780.

Three of the four processor types — the file, cluster and terminal processors — run the Ctos operating system. The applications processor runs under Unix and is based on the 10 MHz Motorola 68010 virtual memory processor.

Megaframe, in its basic single-enclosure configuration for eight users, with 1M byte of error-correcting RAM, one file, application and cluster processor, one 50M-byte Winchester disk, one 50M-byte removable Winchester cartridge and one PT terminal is priced at $17,546. It will be available in August.

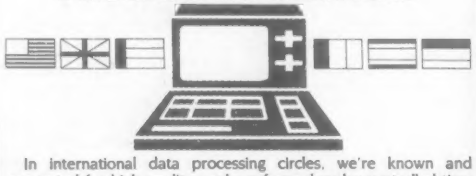
Convergent Technologies is located at 3055 Patrick Henry Drive, Santa Clara, Calif. 95051.

Micro Combo Introduced

NEWTON, Mass. — Cyborg Corp. has recently developed a microcomputer that is said to combine an onboard Motorola, Inc. 68000 microprocessor with several characteristics of the IBM Personal Computer.

The resulting Isaac 2000 system reportedly performs rapid data acquisition and boasts a large memory and true multitasking capabilities. It supports two RS-232 ports and one IEEE-488 interface. The Isaac 2000 is priced at $4,100, Cyborg said from 55 Chapel St., Newton, Mass. 02158.

QUALITY DATA PROCESSING SERVICES



In international data processing circles, we're known and respected for high quality work performed under controlled time and cost conditions. We're P-E Computer Services Inc., a leading software house providing multi-discipline data processing teams to clients the world over.

Since 1959, P-E Computer Services has been working with clients in all aspects of data processing . . . from minis to mainframes, fixed-price programming to time and materials consulting. With our U.S. headquarters based in Houston, international headquarters in England and offices and representatives throughout the world, we have the professional capabilities of servicing clients throughout the United States and overseas.

Because our reputation is so well established in international markets, we are very sincere about selecting only the best and most experienced data processing professionals. Whether they are contract personnel or permanent employees, our staff enjoys top technical and administrative support. **For further information concerning our services, please contact Carol Evans, V.P. Sales/Marketing, (713) 556-9513, P-E Computer Services Inc., Ashford Bank Building, 1035 Dairy Ashford, Suite 300, Houston, Texas 77079.**

P-E Computer Services Inc.
A P-E International Company

This advertisement is not an offer to sell nor a solicitation of an offer to buy these securities. The offering is made only by the Prospectus.

NEW ISSUE

600,000 Shares

HURCO

HURCO MANUFACTURING COMPANY, INC.

Common Stock

Price $16¼ Per Share

Copies of the Prospectus may be obtained from any of the several Underwriters only in such states in which such Underwriters are qualified to act as dealers in securities and in which the Prospectus may be legally distributed.

Hambrecht & Quist Incorporated — Raffensperger, Hughes & Co. Incorporated

Bear, Stearns & Co. — The First Boston Corporation — A. G. Becker Paribas Incorporated

Blyth Eastman Paine Webber Incorporated — Alex. Brown & Sons — Dillon, Read & Co. Inc.

Donaldson, Lufkin & Jenrette Securities Corporation — Drexel Burnham Lambert Incorporated

E. F. Hutton & Company Inc. — Kidder, Peabody & Co. Incorporated — Lazard Frères & Co.

Prudential-Bache Securities — L. F. Rothschild, Unterberg, Towbin

Shearson/American Express Inc. — Smith Barney, Harris Upham & Co. Incorporated

Wertheim & Co., Inc. — Dean Witter Reynolds Inc.

May 4, 1983

wabash®
diskettes for as low as $1.29 each!

Now get Wabash Quality at a CE Price

For over 17 years, Wabash has been making high quality and dependable computer products. Wabash diskettes are made to provide error-free performance on your computer system because every diskette has been totally and hypercritically tested. Since you can now buy Wabash computer products directly from CE, the world's largest distributor of magnetic media, you can now get maximum savings on every order. You can even order toll-free.

New Wabash Six Year Warranty

The quality of Wabash diskettes is stressed throughout the entire manufacturing process. After coating, all Wabash diskettes go through a unique burnishing process that gives each diskette a mirror-smooth appearance. Wabash then carefully applies a lubricant that is specially formulated to increase diskette life. Then, to keep out foreign particles, a unique heat seal bonds the jacket and liner together to help prevent contamination. After 100% hypercritical testing and certification, Wabash then packages each diskette, (except bulk pack) in a super strong and tear resistant Tyvek® evelope. The final Wabash product is then shrink-wrapped to insure cleanliness and reduce contamination during shipment. Wabash diskettes are so very reliable that Wabash now offers a six year warranty in case of defects in materials or workmanship on all diskettes purchased directly from Communications Electronics.

New...Wabash Diskette Duplication Services

Communications Electronics has teamed up with Wabash to provide a single-source solution for the diskette duplication requirements of software developers, OEM's and distributors. All service is in-house, to give you fast, dependable service. In most cases, delivery can be completed in five days. Whether you require 100, 1,000, or 10,000 copies per week, call CE first for a no obligation price quote. For additional information, please write us on your letterhead with your requirements.

SAVE ON WABASH DISKETTES Product Description	Part #	CE quant. 100 price per disk ($)
8" SSSD IBM Compatible (128 B/S, 26 Sectors)	F111	1.89
8" SSSD Shugart Compatible, 32 Hard Sector	F31A	1.89
8" SSDD IBM Compatible (128 B/S, 26 Sectors)	F131	2.39
8" DSDD Soft Sector (Unformatted)	F14A	2.99
8" DSDD Soft Sector (256 B/S, 26 Sectors)	F144	2.99
8" DSDD Soft Sector (512 B/S, 15 Sectors)	F145	2.99
8" DSDD Soft Sector (1024 B/S, 8 Sectors)	F147	2.99
5¼" SSSD Soft Sector w/Hub Ring	M11A	1.49
5¼" Same as above, but bulk pack w/o envelope	M11AB	1.29
5¼" SSSD 10 Hard Sector w/Hub Ring	M41A	1.49
5¼" SSSD 16 Hard Sector w/Hub Ring	M51A	1.49
5¼" SSDD Soft Sector w/Hub Ring	M13A	1.79
5¼" Same as above, but bulk pack w/o envelope	M13AB	1.59
5¼" SSDD 10 Hard Sector w/Hub Ring	M43A	1.79
5¼" SSDD 16 Hard Sector w/Hub Ring	M53A	1.79
5¼" DSDD Soft Sector w/Hub Ring	M14A	2.69
5¼" Same as above, but bulk pack w/o envelope	M14AB	2.49
5¼" DSDD 10 Hard Sector w/Hub Ring	M44A	2.69
5¼" DSDD 16 Hard Sector w/Hub Ring	M54A	2.69
5¼" SSQD Soft Sector w/Hub Ring (96 TPI)	M15A	2.59
5¼" DSQD Soft Sector w/Hub Ring (96 TPI)	M16A	3.69
5¼" Tyvek Diskette Envelopes - Price per 100 Pack	TE5	12.00

SSSD = Single Sided Single Density; SSDD = Single Sided Double Density; DSDD = Double Sided Double Density; SSQD = Single Sided Quad Density; DSQD = Double Sided Quad Density; TPI = Tracks per inch.

Quantity Discounts Available
Wabash diskettes are packed 10 disks to a carton and 10 cartons to a case. The economy bulk pack is packaged 100 disks to a case without envelopes or labels. Please order only in increments of 100 units for quantity 100 pricing. With the exception of bulk pack, we are also willing to accommodate your smaller orders. Quantities less than 100 units are available in increments of 10 units at a 20% surcharge above our 100 unit price. **Quantity discounts** are also available. Order 500 or more disks at the same time and deduct 1%; 1,000 or more saves you 2%; 2,000 or more saves 3%; 5,000 or more saves 4%; 10,000 or more saves 5%; 25,000 or more saves 6%; 50,000 or more saves 7%, 100,000 or more saves 8%, 500,000 or more saves 9% and 1,000,000 or more disks earns you a 10% discount off our super low quantity 100 price. Almost all Wabash diskettes are immediately available from CE. Our efficient warehouse facilities are equipped to help us get you the quality product you need, when you need it. If you need further assistance to find the flexible disk that's right for you, call the Wabash compatibility hotline. Dial toll-free 800-323-9868 and ask for your compatibility representative. In Illinois or outside the U.S. dial 312-593-6363 between 9 AM to 4 PM Central time.

Buy Wabash Diskettes with Confidence
To get the fastest delivery from CE of your Wabash computer products, we recommend you phone your order directly to our Computer Products Division and charge it to your credit card. Be sure to calculate your price using the CE prices in this ad. Written purchase orders are accepted from approved government agencies and most well rated firms at a 30% surcharge for net 30 billing. For maximum savings, your order should be prepaid. All sales are subject to availability, acceptance and verification. All sales are final. All prices are in U.S. dollars. Prices, terms and specifications are subject to change without notice. Out of stock items will be be placed on backorder automatically unless CE is instructed differently. Minimum *prepaid* order is $50.00. Minimum *purchase order* $200.00. All shipments are F.O.B. Ann Arbor, Michigan U.S.A. No COD's please. Non-certified and foreign checks require bank clearance.

For **shipping charges** add $8.00 per case or partial case of 100 8-inch flexible disks or $6.00 per case or partial case of 100 5¼-inch mini-diskettes for U.P.S. ground shipping and handling in the continental U.S.A.

Mail orders to: Communications Electronics, Box 1002, Ann Arbor, Michigan 48106 U.S.A. If you have a Visa or Master Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-521-4414. In Canada, order toll-free by calling 800-265-4828. If you are outside the U.S. or in Michigan dial 313-994-4444. Telex anytime 810-223-2422. Order your Wabash diskettes today.

Copyright ©1983 Communications Electronics™ Ad #U12483

MasterCard VISA MEMBER DIRECT MAIL MARKETING ASSOCIATION

Order Toll-Free!
800-521-4414
In Michigan 313-994-4444

wabash error-free diskettes

COMMUNICATIONS ELECTRONICS™

Computer Products Division

818 Phoenix ☐ Box 1002 ☐ Ann Arbor, Michigan 48106 U.S.A.
Order TOLL-FREE 800-521-4414 or outside U.S.A. 313-994-4444

Programmable Controller Takes to Factory Floor

(Continued from Page 117)
other set of wires hooking it up to a control panel.

The control panel provides the interface between a human operator and the controller. Like the controller, the panel is a custom-made, hard-wired piece of equipment. Through a series of lights and switches embedded in the panel, an operator can monitor and control what is happening to the machine or process.

This format has a number of serious limitations. The electromechanical controller is dedicated to one set of functions only. Expensive and laborious rewiring is required in the controller, control panel or both every time a change is needed in machine operations. Such controllers cannot communicate with each other, receive data or inquiries from computers or generate documentation on the status of the machine. When something goes wrong, it may not be easy to detect whether the problem lies in the machine, the control system or the masses of wires that tie them together.

For these reasons, manufacturers in the past decade have been looking to the controller on a chip for greater programming flexibility, adaptability, speed, ease of use and reliability under varying conditions.

The programmable controller is a solid-state device, not electromechanical, and consists of several components. Input ports or registers indicate the status of machine or process operations, while output registers carry signals needed to direct the machine. A CPU scans the input data on machine status in relation to the initiation of appropriate output signals. The CPU is itself directed by instructions encoded in nonvolatile memory.

Like an electromechanical controller, the programmable controller is event-driven and may be programmed using the ladder diagram format. In effect, the physical parts that were used to carry out timing, counting, sequencing and other functions have been electronically replaced by the memory residing in it. An operator can enter the required logic functions into the programmable controller memory using a keyboard based on the familiar symbols of these functions.

The continuing use of ladder logic with programmable controllers is due more to cultural considerations than to technological constraints. User-resistance and retraining among electricians and technicians can be reduced when they are confronted with devices that mimic formats with which they are already comfortable.

The fundamental advantage of a programmable controller is that, unlike a relay controller, only one type of equipment is needed for any given machine. When a sequence or process change is needed, this may be accomplished solely by altering the device's program without tearing down and restructuring the controller and its complex of external wires. This makes for associated cost savings in assembly, inventory, maintenance and pretesting of control designs.

The programmable controller is competing not only with the older controller but with general-purpose computers as well. With more memory and the use of higher level programming languages than those available to the average programmable controller, the general computer can undertake a correspondingly greater and more versatile array of machine monitoring and communications functions.

The computer, however, has its own limitations as well. Compared with the programmable controller, it has not been designed for the temperature, noise and humidity conditions that can prevail on the factory floor. Also, operating the computer usually requires a higher level of education than that needed to run or maintain a programmable controller.

The programmable controller control panel has remained relatively unchanged from the time of its predecessor.

Livingston is with State Street Consultants, Inc. in Boston.

ARE YOUR PRESENTATIONS GETTING LOST IN THE CROWD?

New Electrohome ECP 1000 color computer/video projection system. So sophisticated it's simple.

Here's the simply remarkable solution for training sessions, sales meetings, boardroom decisions and other group presentations.

New ECP 1000 projects computer graphics to big screen size in brilliant color and sharp detail, even with normal room lighting. High resolution and 80 character display makes computer data easy to read.

The most advanced system for today is so advanced it's ready for tomorrow. ECP 1000 was designed for today's business computer needs. So, you're assured of the ultimate color or monochrome performance from today's video tapes, video discs and off-air signals—as well as from the next generation of high definition video.

Designed for non-technical people.

It may seem surprising that such a sophisticated system is so easy to operate. We've designed it that way.

For example, other color projection systems have three external lenses that must be separately and painstakingly adjusted to

NOW PROJECT COMPUTER DATA AND GRAPHICS OR VIDEO TAPES TO BIG SCREEN SIZE!

Advanced Digital Unwraps Z80-Based Micro

GARDEN GROVE, Calif. — Advanced Digital Corp. has announced the Super-System, a S-100 microcomputer based on the Zilog, Inc. Z80 microprocessor.

The Super-System employs a master/slave architecture that gives each user a dedicated Z80 microprocessor. A large number of users can be linked to the system without experiencing a degradation in performance, a vendor spokesman claimed.

A base system includes a Z80A microprocessor, 64K bytes of main memory, 2K or 4K bytes of erasable programmable read-only memory (Eprom), a 5¼-in. or 8-in. floppy disk drive, two serial and two parallel I/O ports and a real-time clock. A base system, including a power supply and chassis, an eight-slot motherboard and Digital Research, Inc.'s CP/M operating system, costs $2,675.

A slave processor, which includes a dedicated microprocessor, four serial and two parallel interface ports, between 2K and 4K bytes of Eprom, between 64K and 128K bytes of random-access memory, costs $650, the vendor said from 12700-B Knott Ave., Garden Grove, Calif. 92641.

Additions for Certainty Unveiled

MINNEAPOLIS — Control Data Corp. has unveiled two additions to its Certainty Series fixed disk system line used with the IBM Series/1 minicomputers.

These products, the Certainty 231 and 241, are said to provide double the maximum storage capacity of previous units at a 30% increase in price. The fixed disk drives provide either 63.2M or 126.4M bytes of sealed modules random-access data storage, a vendor spokesman said.

At the same time, the vendor announced replacements for its current line of 63.2M-byte models of Certainty 230 and 240 Series MMD disk storage systems. These models can reportedly be field-upgraded to 126.4M bytes for $3,500, according to the vendor spokesman.

Prices for the Certainty 231 and 241 disk systems range from $12,325 to $19,200 in quantities of five through nine, the vendor said through Box O, Minneapolis, Minn. 55440.

Controller, Disk Unit Fit IBM Micro

SCOTTS VALLEY, Calif. — Mountain Computer, Inc. has announced a hard disk interface/controller and a half-height hard disk subsystem for IBM's Personal Computer.

The controller reportedly allows IBM Personal Computer users to upgrade to the newly announced IBM XT microcomputer at about half the cost of the IBM expansion chassis, according to a spokesman for the vendor.

In addition, the device allows current XT users to add extra disk drives to their systems, the vendor spokesman said.

The Mountain Computer controller is compatible with the Microsoft, Inc. MS-DOS Release 2.0 operating system and costs $450, the vendor said.

The firm also announced a half-height Winchester hard disk subsystem for use with IBM Personal Computers and microcomputers developed by Apple Computer, Inc.

Called the Mountain Space Saver, the device offers up to 5M bytes of storage, according to the spokesman.

The Mountain Space Saver costs $995 without a controller, and a cartridge disk subsystem costs $1,325 without a controller, the vendor spokesman said.

More information is available from the vendor, which is located at 300 El Pueblo Road, Scotts Valley, Calif. 95066.

converge colors on the screen. But, our LAD (Laser Aligned Dichroics) breakthrough automatically converges all colors within the unit and projects a sharp brilliant picture through a single bright lens.

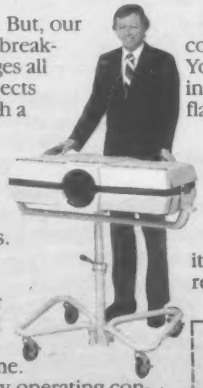
There's no guess work about positioning the unit in relation to the screen. A range finder automatically tells you the perfect position in seconds.

Nor is there any guess work about what plugs into where. One cable carries all computer and video input signals as well as remote control. Set up is fast, easy and perfect every time.

Moreover, there are very few operating controls and they are clearly labelled and readily accessible. Once again—no guess work!

Completely versatile.

You have total flexibility during presentations. You simply push a button to switch smoothly between computer and video inputs with no change in picture size.



ECP 1000 is readily interfaced with most color and monochrome computer terminals. You can readily adjust it for different set-ups including floor, ceiling and rear projection on flat or curved screens.

It's a complete system available with decoder/remote control unit, input cable, high-brightness screen, wheeled cart for portable use and a ceiling mount. ECP 1000 is U.L., F.C.C. and C.S.A. approved.

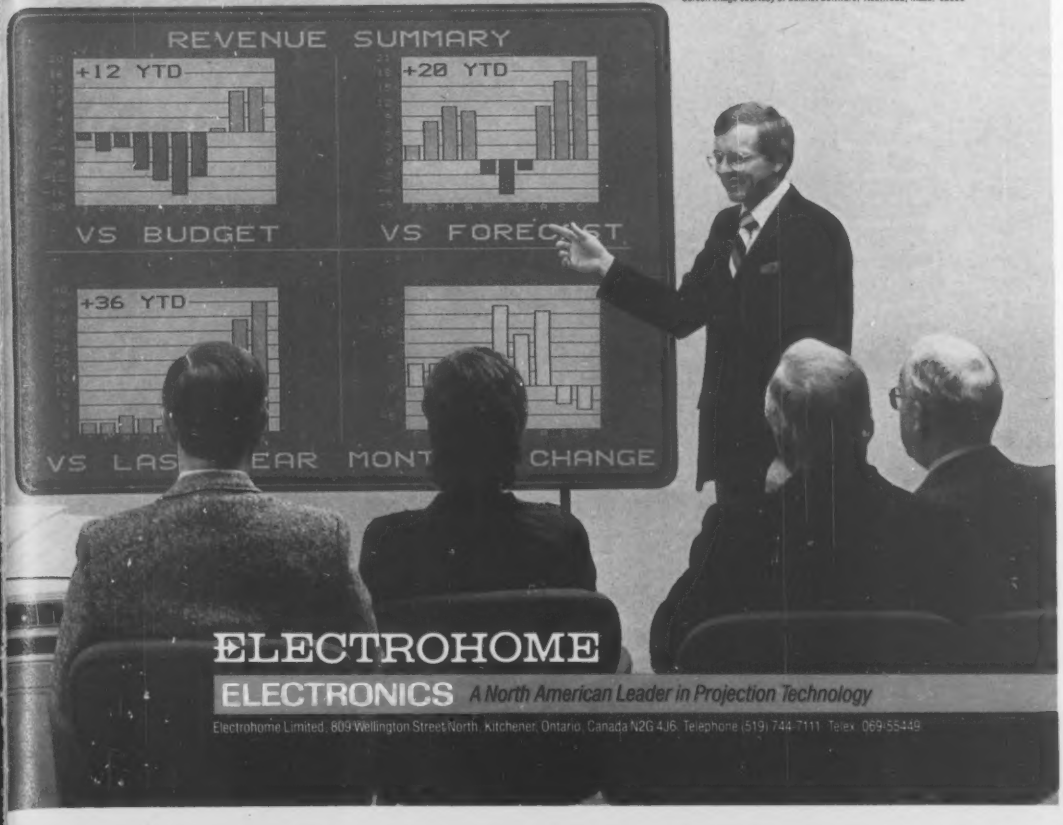
A brief demonstration will prove how easy it is to see the big picture with the simply remarkable Electrohome ECP 1000.

☐ Please send me more information on the ECP 1000
☐ I am a prospective dealer. Please send me more information.
☐ Please have a representative call

Electrohome Limited
Advertising Department
Postal Station "D"
Box 10133
Buffalo, N.Y.
14210-0133

Name
Street
City State
Zip Code Phone

Screen image courtesy of Cullinet Software, Westwood, Mass. 02090



ELECTROHOME
ELECTRONICS A North American Leader in Projection Technology

Electrohome Limited, 809 Wellington Street North, Kitchener, Ontario, Canada N2G 4J6. Telephone (519) 744-7111. Telex 069-55449

NCR Unveils Film Cassette

DAYTON, Ohio — NCR Corp. has unveiled a large-size film cassette option and a 10M-byte disk for its 5300 series of computer output microfiche (COM) recorder systems. At the same time, the company announced a high-speed autoload microfiche duplicator that reportedly uses software-generated bar codes to communicate.

The film cassette, called Series 53, is said to hold 500 feet of silver halide film, which will produce 1,000 microfiche. The disk drive consists of one fixed 5M-byte disk and one removable 5M-byte disk, according to a vendor spokesman. The 4207-AL automatic fiche duplicator attaches directly to NCR's 5300 COM recorder for duplication purposes and costs $44,000.

Further details may be obtained from NCR headquarters in Dayton, Ohio 45479.

Comark Offers Tape Controller For Pertec Drives

WALTHAM, Mass. — A magnetic tape controller with direct memory access control has been unveiled here by Comark Corp.

The MT 86 is a multibus resident ½-in. magnetic tape interface to industry standard reel-to-reel Pertec Computer Corp.-compatible tape drives, the vendor said. It reportedly provides for 16 different tape operations, 11 registers, one interrupt and three error/status checks and supports both 7- and 9-track drives.

The price of this device is $1,295. Comark can be contacted at 257 Crescent St., Waltham, Mass. 02154.

Tape System Fits IBM System/34

CENTERPORT, N.Y. — General Systems Center, Inc. has announced an addition to its line of magnetic tape systems that are compatible with IBM's System/34 and Personal Computer.

The magnetic tape systems reportedly include software to operate the system and offer applications including IBM bisynchronous tape communication, medical insurance reporting, insurance company data exchange, service bureau applications, mainframe data transfer and banking/brokerage data to microfiche.

The system costs under $10,000 through P.O. Box 416, 95 Centershore Road, Centerport, N.Y. 11721.

Disk Subsystem Out For Hewlett-Packard

SAN JOSE, Calif. — Bering Industries, Inc. has announced a high-capacity 5¼-in. Winchester disk subsystem for use with Hewlett-Packard Co. computers.

Each Bering 4895-11 and 4895-21 reportedly provides 15.5M bytes of formatted Winchester disk storage, with an optional 1.2M-byte 8-in. floppy disk drive in the same enclosure. The average data transfer rate with these subsystems is 164K byte/sec, according to the vendor.

Prices of the 4895 series range from $3290 to $6,990. Further details may be obtained from the vendor at 747 E. Brokaw Road, San Jose, Calif. 95112.

Computer-Aided Drafting Announced by Andromeda

CANOGA PARK, Calif. — A computer-aided drafting system (Cads) has been announced here by Andromeda Systems, Inc.

The A-Cads/1 system incorporates a Digital Equipment Corp. LSI-11/23 CPU, 64K-byte random-access memory, five serial RS-232C ports, a CRT, a floppy and Winchester controller, a joystick interface and several expansion slots, according to a spokesman for the vendor.

The system is aimed at users who are not necessarily computer experts and offers a range of Help features in addition to graphics, project scheduling, client billing and other software functions.

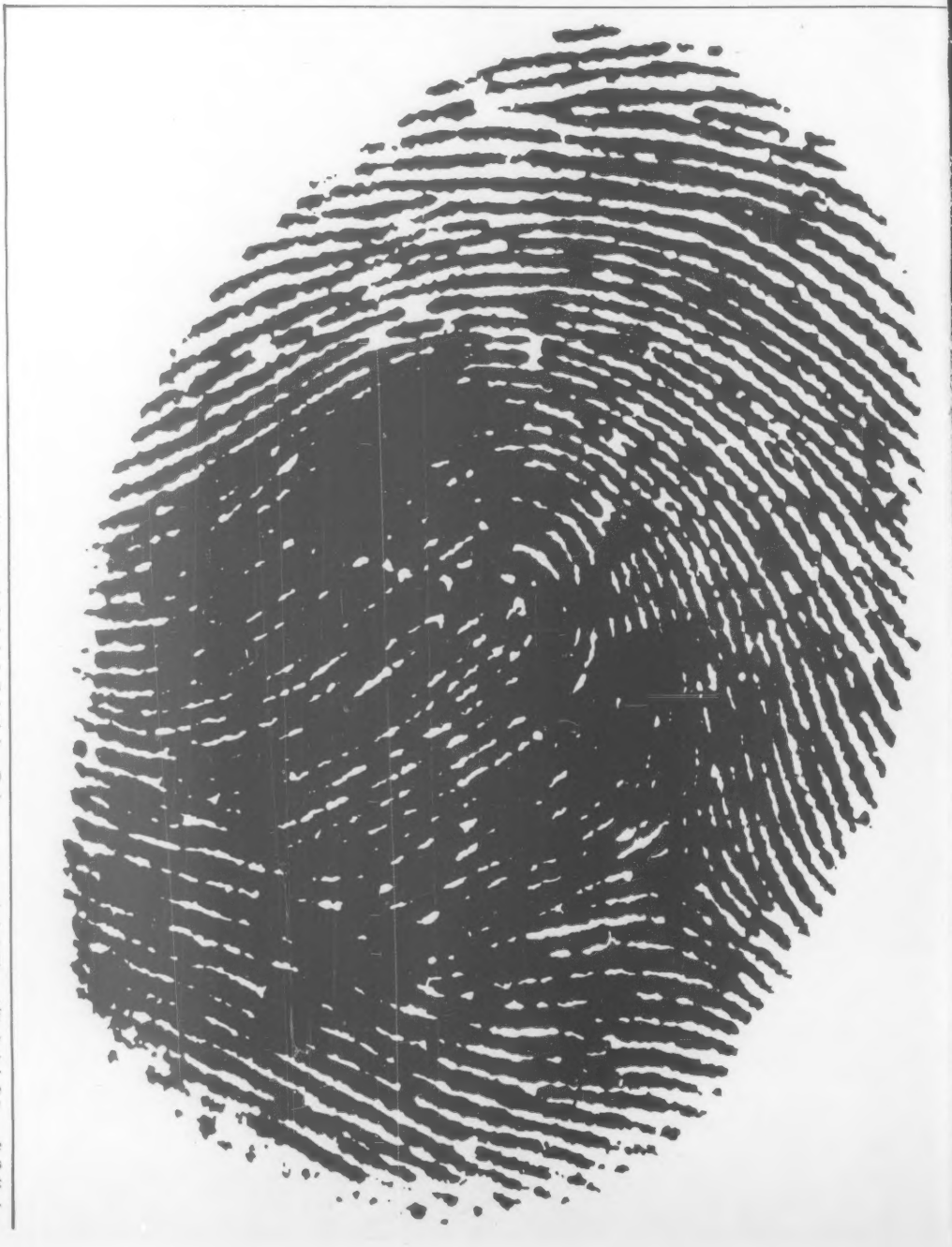
The A-Cads/1 is available for $24,000 from Andromeda Systems at 9000 Eton Ave., Canoga Park, Calif. 91304.

Multifunction Desktop Unveiled

COSTA MESA, Calif. — A multiuser multifunction desktop computer system has been unveiled here by Microtech Business Systems, Inc.

The M1 Series Desktop Computer is designed for first-time users, according to the vendor. Capable of handling up to five users, the M1 Series reportedly features a high-speed 16-bit microprocessor with 128K bytes of random-access memory. It is presently available in three models: the M1/10, M1/34 and the M1/68, with 10M bytes, 34M bytes and 68M bytes of Winchester disk storage capacity, respectively.

All models include a 20M-byte, ¼-in. streaming tape drive, the Iris or Bits operating system and five serial ports. Pricing starts at $12,000. Microtech is based at 3180 Pullman St., Costa Mesa, Calif. 92626.



For IBM Personal Computer

Voice Synthesis Board Out

CLEVELAND — Tecmar, Inc. h announced the PC-Mate Speech Ma ter, a voice synthesis board for IBM's Personal Computer.

PC-Mate provides synthetic voice output, text-to-speech conversion and an optional unit that expands the unit's vocabulary. The board offers two utility programs: English, which provides a software base for speech-to-text conversion, and Speak, which assigns function keys for several operational modes, the vendor said.

The PC-Mate Speech Master board costs $395. The Speech-Master software support package costs $95 and a Speech Master Auxiliary Vocabulary Unit costs $100, the vendor said from 23600 Mercantile Road, Cleveland, Ohio 44122.

Family of High-Speed Line Printers Announced by Southern Systems

FORT LAUDERDALE, Fla. — A family of high-speed line printers has been introduced here by Southern Systems, Inc.

Available in 1,500 to 2,000 line/min speeds, the printers come complete with interfacing, controllers and cabling to hook up with IBM, Digital Equipment Corp., Data General Corp., Perkin-Elmer Corp., Centronics Data Computer Corp., Texas Instruments, Inc., Burroughs Corp. and other systems, the vendor said.

Priced from $21,000, the printers are available from Southern Systems at 2841 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Comfiler Fits Epson QX-10

TORRANCE, Calif. — A 5¼-in. Winchester disk drive has been introduced here by Comrex International, Inc., which reportedly offers Epson America, Inc.'s QX-10 computer users 10M bytes of fast-access storage capacity.

With Comfiler, users of the Epson QX-10 can boost their volume of word processing, scheduling, filing, graphics, electronic mail and other functions, according to Comrex. The disk drive is said to feature capacity to 10M bytes of formatted or 12.8M bytes of unformatted memory. It is also compatible with the Digital Research, Inc. CP/M 2.2 operating system, as well as the Epson operating system software.

This product is priced at $2,295, the vendor said from 3701 Skypark Drive, Torrance, Calif. 90505.

Turnkey Targets Manufacturers Running Pick

BELLEVUE, Wash. — Integram, Inc. has announced that it will make available a turnkey computer manufacturing system designed for use by small to mid-size manufacturers.

The integrated system, known as Integram System/Manufacturing, is designed to run under Pick & Associates, Inc.'s Pick operating system software. It is command-driven and provides access to nontechnical users, according to a spokesman for the vendor.

Some of its features include engineering functions, sales order entry capability, inventory control, purchase order control, shop floor control, materials requirement planning/master scheduling and forecasting and costing, the vendor said.

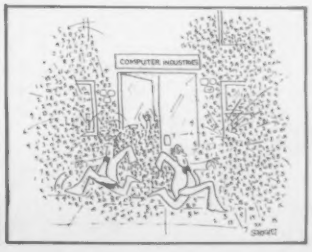
Systems are typically priced in the range of $40,000 to $80,000, the vendor said from 1150 140th Ave. N.E., Bellevue, Wash. 98005.

Prices Slashed On MPC 1600s

COLUMBIA, Md. — Columbia Data Products, Inc., in response to IBM's latest round of price cuts, has announced price cuts on two IBM Personal Computer-compatible, 16-bit microprocessors, the MPC 1600-1 and the MPC 1600-4.

Effective immediately, the MPC 1600-1 single-board 8088 processor will be reduced from $3,995 to $3,395. The MPC 1600-4, which reportedly offers greater storage capacity than the former processor, will now sell for $4,995, down from $5,995.

Further details may be obtained from the vendor at 8990 Route 108, Columbia, Md. 21045.



No two businesses are alike either.

Your business is unique.

And your problems are unique.

So, if you want to buy a small business computer, where can you go to get some understanding and help?

IBM.

We have a range of small business computers starting at under $4,000. There's one that can be tailored to fit your unique needs and grow as your business grows.

Thousands of software programs are written for IBM. So whether your business is agriculture or zoology, you can find the right software, right away.

If you ever need help, IBM has the most experienced and widely skilled service organization in the business.

If you didn't think IBM offered so much to solve your unique problems, think of it this way:

We're unique too.

For a free brochure or demonstration of IBM's small business computers call your local IBM sales office or our toll-free number below.

IBM

Call *IBM Direct* 1 800 631-5582 Ext. 90. In Hawaii/Alaska 1 800 526-2484 Ext. 90.
(Or write IBM, DRM, Dept. 1K390, 400 Parson's Pond Drive, Franklin Lakes, N.J. 07417)

Software with vision.™

Fingraph™ has been called modern art for managers.

You'll find it beautiful if you're the kind of person who gets excited by a system that takes raw data of all kinds and transforms it, before your eyes, into graphics that give you historical comparisons, future projections and just about everything you need to plan tomorrow.

That's why we call it software with vision.

FINGRAPH™

SEE US AT DEXPO (BOOTH 536) AND DECUS (BOOTH 21)

FINGRAPH CORPORATION, 960 CLOCK TOWER DRIVE, SPRINGFIELD, IL 62704 (217) 793-0984

Quantex Unveils Matrix Printer

HAUPPAUGE, N.Y. — The Quantex Division of North Atlantic Industries, Inc. has announced a multiple-speed printer for letter-quality and word processing applications called the Model 7040.

Compatible with Diablo Systems, Inc. Model 630, the matrix printer is capable of generating graphics and has a single-sheet feed capability, a spokesman noted.

The unit can be used with any word processing or graphics system that can use a Diablo 630 daisywheel printer. The Model 7040 costs $2,195, the vendor said from 60 Plant Ave., Hauppauge, N.Y. 11788.

Conver Unwraps AC100 Series Of Switching Power Supplies

CUPERTINO, Calif. — Conver Corp. has recently unveiled its AC100 series of 100W, multiple-output switching power supplies.

These products are designed for systems using 5¼-in. or 8-in. Winchester or floppy disk drives and can reportedly provide up to 150W peak power.

The base price for a single AC100 unit is $200, the vendor said from 10629 Bandley Drive, Cupertino, Calif. 95014.

Fastcard Fits Apples, Speeds Performance

SANTA CLARA, Calif. — Synertek, Inc. has announced the Fastcard, a performance enhancement board for Apple Computer, Inc. Apple II and Apple II+ microcomputers.

The device reportedly gives Apple users the capability of executing programs at more than three times their normal speed while providing all the functions of a random-access memory (RAM) card, the vendor said.

The Fastcard contains 16K bytes of RAM and a Commodore Business Machines, Inc.'s 6502 microprocessor. A 5¼-in. floppy disk drive is also provided, the vendor said.

The Fastcard costs $299.95, the vendor said from 3001 Stender Way, MS-34, Santa Clara, Calif. 95054.

Storage Units Introduced By Sysgen

FREMONT, Calif. — Two hard disk mass storage memories for the IBM Personal Computer have been unveiled here by Sysgen, Inc.

The two Winchester-type devices feature high-speed streaming tape cassette back-up and provide formatted storage of 10M bytes (Model II-10) or 20M bytes (Model II-20), the vendor said. The products are said to operate under either IBM's PC-DOS or Digital Research, Inc.'s CP/M 86 operating system software.

Suggested retail price for the Sysgen II-10 is $2,995, and the Sysgen II-20 costs $3,795. Further details are available from the vendor at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Floppy Unit Runs on DEC

PLACENTIA, Calif. — Micro Technology, Inc. has announced a 22-bit Q-bus 8-in. floppy controller compatible with Digital Equipment Corp.'s LSI-11 computers.

The MXV22 reportedly controls up to four disk drives with up to 1M byte of formatted data per drive.

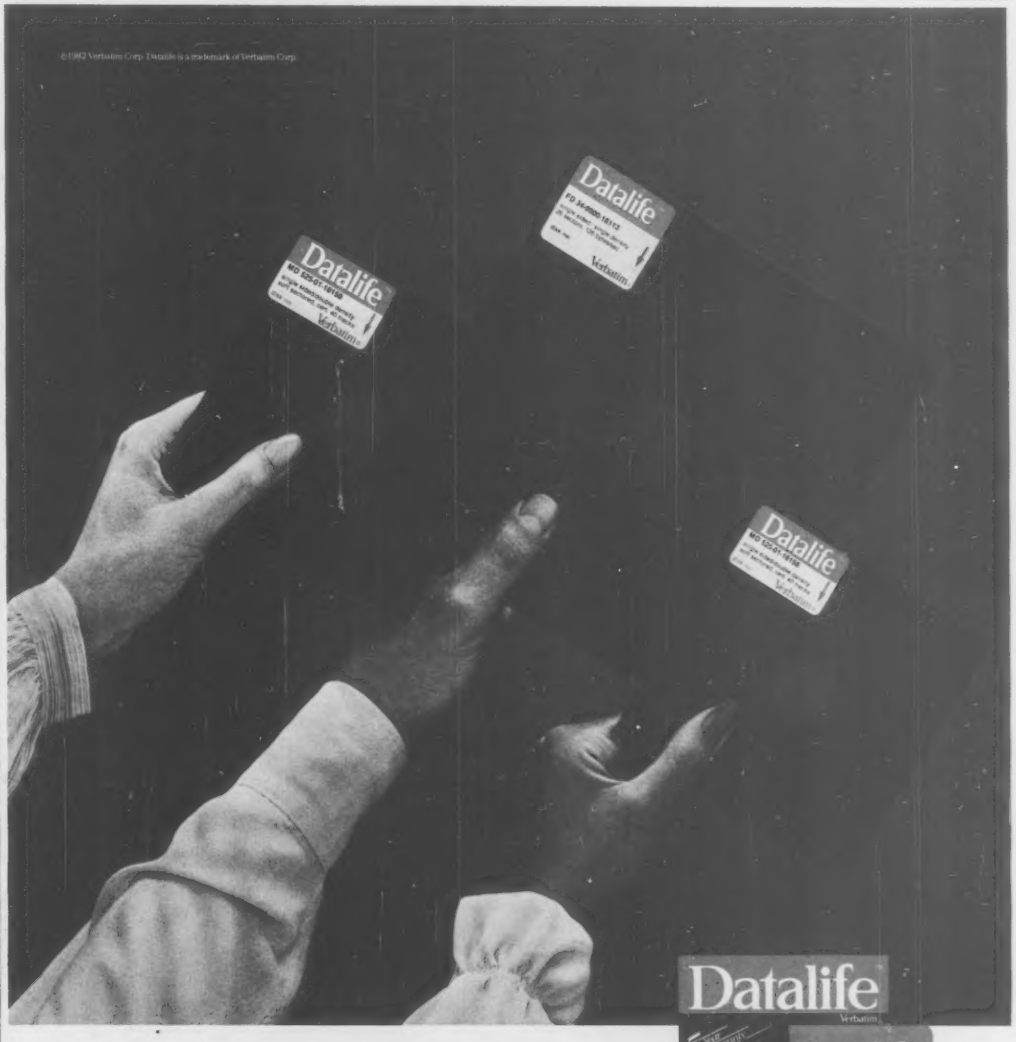
The product is available for $990 from Micro Technology at 1620 Miraloma Ave., Placentia, Calif. 92670.

IBM Micro Gets Expansion Board

LOGANSPORT, Ind. — Memory Technologies, Inc. has introduced a modular multifunction expansion board for the IBM Personal Computer, the IBM Personal Computer XT and plug-compatible systems.

The Versa-RAM Plus II board is said to allow the addition of up to 512K bytes of random-access memory.

It costs $475 from 4343 Grand Prix Dive, Logansport, Ind. 46947.



To win the computer revolution, you need the right ammunition.

The computer revolution is changing the way we do so many things including the way we make mistakes.

But many computer errors aren't really the computer's fault. Often, it's the flexible disk that's become weak or worn out.

Problems like that won't happen if you use Datalife™ flexible disks. They're certified 100% error free and backed by a 5-year warranty, which means the information you put on one stays put.

So, if you're part of the computer revolution, make sure you always come out a winner. Use Datalife by Verbatim, the world's leading producer of flexible disks.

For your nearest Verbatim dealer, call toll-free 800-538-1793; in California or outside the U.S., call collect (408) 737-7771.

Bits & Pieces

Streaming Cassette Backup Designed for IBM XT Micro

FREMONT, Calif. — A streaming cassette tape backup for IBM's XT hard disk version of its Personal Computer has been introduced here by Sysgen, Inc.

The Sysgen Image backup subsystem reportedly includes controller, drive electronics and tape drive. It is said to be software compatible with either IBM's PC-DOS or Digital Research, Inc.'s CP/M 86 operating system software.

Storage capacity of the streaming tape cassette in the Sysgen Image is 20M bytes, according to a vendor spokesman.

Priced at $995, the Sysgen Image is available from Sysgen, located at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Copy Service Announced To Verify Floppy Diskettes

BRICKTOWN, N.J. — User Friendly East, Inc. (UFE) has announced the formation of a floppy diskette duplication service to copy and verify flexible disk information.

Additional services include: preformatted and certified diskettes in a variety of formats, serialization for duplicated diskettes, piracy prevention and archival and secure storage for master diskettes, according to the vendor.

The average price is $2.30/disk for 1,000 ordered. More information is available through UFE at Box U, Bricktown, N.J. 08723.

Two Storage Spoolers Unveiled by Consolink

LONGMONT, Colo. — Consolink Corp. has introduced two standalone intermediate storage spoolers which incorporate microprocessors.

The Microspooler buffer/interface can receive data from any transmitted source and can be used as a separate data collection device, a spokesman said. It can also be used as a stacker/mixer. Selection can be made of sentences, paragraphs, data tables or graphics from different programs and stacked in memory in any order.

The product provides an interface between noncompatible computers and printers, can produce up to 99 copies, includes a pause button and offers single-sheet feeding. Buffer status readout gives a continuous update of the amount of memory in use, the spokesman said. It also indicates how much data is yet to be printed. The basic unit contains 16K bytes of memory, expandable to 64K bytes and costs $199 for the parallel-to-parallel interface unit.

Superspooler includes basic features of Microspooler. Other features include pagination/formatting, space compression, page heading and hard and soft reset buttons. The basic unit includes 16K bytes of memory. Optional features include two additional ports, one serial input and one serial output and memory expansion up to 62K bytes. The base price is $349, with the memory expansion option priced at $159 and serial option priced at $95.

Both products are available from Consolink at 1840 Industrial Circle, Longmont, Colo. 80501.

QDP Computer Systems Offers Pair of RAM Disks

CLEVELAND — Two additional random-access memory RAM disks, available in either a 256K-byte or 512K-byte configuration, have been introduced here by QDP Computer Systems.

These memory boards reportedly program the QDP microcomputer system to access the memory as if it were a disk, enhancing the machines throughput, according to the vendor.

They cost $945 and $1,495, respectively, the vendor said from 10330 Brecksville Road, Cleveland, Ohio 44141.

Adapter Interface Board Fits IBM's Personal Computer

ELK GROVE VILLAGE, Ill. — Amdek Corp. has announced a Multiple Adapter Interface board for IBM's personal computers.

The unit features 128K bytes of dynamic random-access memory and a two-position switch which allows the user to select between monochrome video display or color graphics applications. The board allows access to the display memory at any time, providing interference-free performance while screen editing is processing at full speed, the vendor said.

The board costs $799, the vendor said from 2201 Lively Blvd., Elk Grove Village, Ill. 60007.

Series of Power Systems Out for Minicomputers

ANAHEIM, Calif. — General Power Systems has announced the GPS-2K series of on-line uninterruptible power systems for minicomputers.

The GPS-2K can operate from a 120Vac 60 Hz utility power line with backup provided by sealed batteries. Options include a static switch for communications with RS-232 devices, additional batteries, rack or standard enclosures and various input voltage and frequencies.

The GPS-2K costs from $3,950, including batteries capable of sustaining a full-rated load for at least 10 minutes, the vendor said from 1400 N. Baxter St., Anaheim, Calif. 92806.

Check to see how SEED® sets the standard for DBMS comparison.

Compare any DBMS with SEED for...

	SEED DBMS	Other DBMS	Other DBMS
Transportability SEED lets you standardize development within your organization by running on a wider range of hardware than any other DBMS—DEC, IBM, Prime, Perkin-Elmer and CDC. You can transport applications across machines, and develop applications on a micro to operate them on a mainframe—or the reverse.	✓		
Flexibility SEED's flexibility answers your demands for reduced programming, faster development and more efficient operation. SEED supports a variety of data base architectures.	✓		
"Smart" Decision Support Tools SEED's non-procedural decision support tools—HARVEST® query language, BLOOM® report writer, and RAINBOW graphics get information out of a complex data base without the need for programming.	✓		
Application Development Tools SEED KERNEL® employs a dictionary to permit centralized definition of your data base contents. KERNEL lets you build custom applications with COBOL, FORTRAN, or VISTA, the SEED screen formater. KERNEL utilities help you in tuning your application, speeding its development, ensuring its data reliability, loading the data base from files, and testing your data access algorithms.	✓		
Journaling and Security Facilities SEED's journaling capability keeps your data base uncorrupted. SEED also adds its own security features to those of your host computer to protect your information from unauthorized access.	✓		
Service We put experienced professionals at your disposal. Through a telephone hotline, you have access to an extensive consulting team, personalized on-going support and maintenance.	✓		

Get Complete Details on SEED now. Find out more about how SEED DBMS increases productivity for managers, programmers, and end-users, and how SEED makes DBMS maintenance and operation more economical. Send for the SEED DBMS Information Kit now. It's free. Or call us at (215) 568-2424. Also ask for information on our free DBMS Seminars.

C51683

☐ Send me the Information Kit.
☐ Call to discuss my specific requirements.
☐ Send me details on DBMS Seminars.

Name Title

Company

Address

City State Zip

Telephone

☐ OEM ☐ System Integrator ☐ End User

Computer

Operating System

UNITED TELECOM COMPUTER GROUP

SEED SOFTWARE
2300 Walnut Street
Suite 734
Philadelphia, Pa.
19103
(215) 568-2424

Funny how programming grows on you.

Oh, it all starts out innocently enough. A printout here. A reference manual there.

But before you know it, all those papers and books and program listings are sprouting up all over the place.

And if you haven't got a way to keep it all under control, well, you could have a real nightmare on your hands.

The fact is, without an efficient, well thought out approach to managing project materials at your workstation, you can easily waste up to 25% of your time just trying to keep all that information under control.

At Wright Line, that kind of mayhem is one thing we just don't want to see you cultivate. So we offer a unique system of information media management products, including filing devices, cabinets and work surfaces, to help you keep things from getting out of hand.

In fact, nobody else can begin to approach our system for its flexibility or its ability to integrate so perfectly into any workstation environment.

Whether it's a conventional office or open plan furniture.

And because we know everybody works differently, our system is designed to be designed. To let you structure it precisely to your own work style or personal preference.

No matter what stage your projects are in — in-process, reference or archival — you get a system that fits you. Which means we can actually help you spend more time working with your media. And less time fighting it.

So, if your workstation seems like a bad dream, let us know. Before things start getting under your skin. For more information contact Wright Line, 160 Gold Star Boulevard, Worcester, MA 01606.

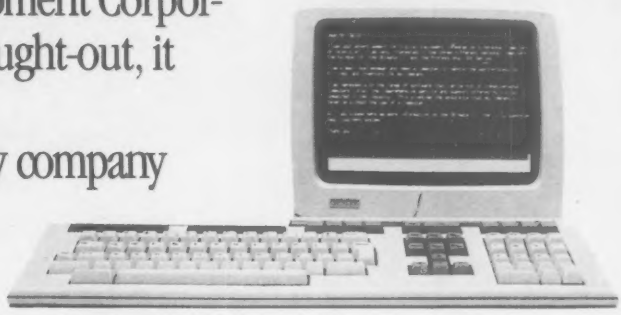
Wright Line
A UNIT OF BARRY WRIGHT

A COMPANY THAT CAN'T STAND BEHIND ITS PERSONAL COMPUTERS SHOULDN'T ASK YOU TO SIT IN FRONT OF ONE.

The plain truth about personal computers is this: most companies have a fairly shallow commitment to service.

Yet one company, Digital Equipment Corporation, has a service program so well thought-out, it overshadows all others in the industry.

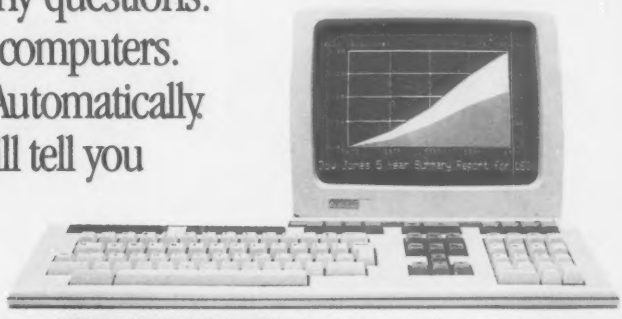
For example, Digital is the only company to offer a 90-day warranty on both hardware *and* software. We provide a toll-free hotline, manned by personal computer specialists, who will answer any questions. We even put service *inside* our personal computers.



DECmate II The fully supported office and small business system.

Turn one on and it tests itself. Automatically. If there's ever a problem, the computer will tell you *exactly* what it is.

Then, you've got three *convenient* ways to get it fixed. Call in one of Digital's service professionals; bring your personal computer into one of our 160 carry-in service centers; or order a replacement module yourself through our DECmailer service.



PROFESSIONAL 300 SERIES The minicomputer of personal computers.

We went to a lot of trouble to provide all this service. And the irony is, you probably won't need it.

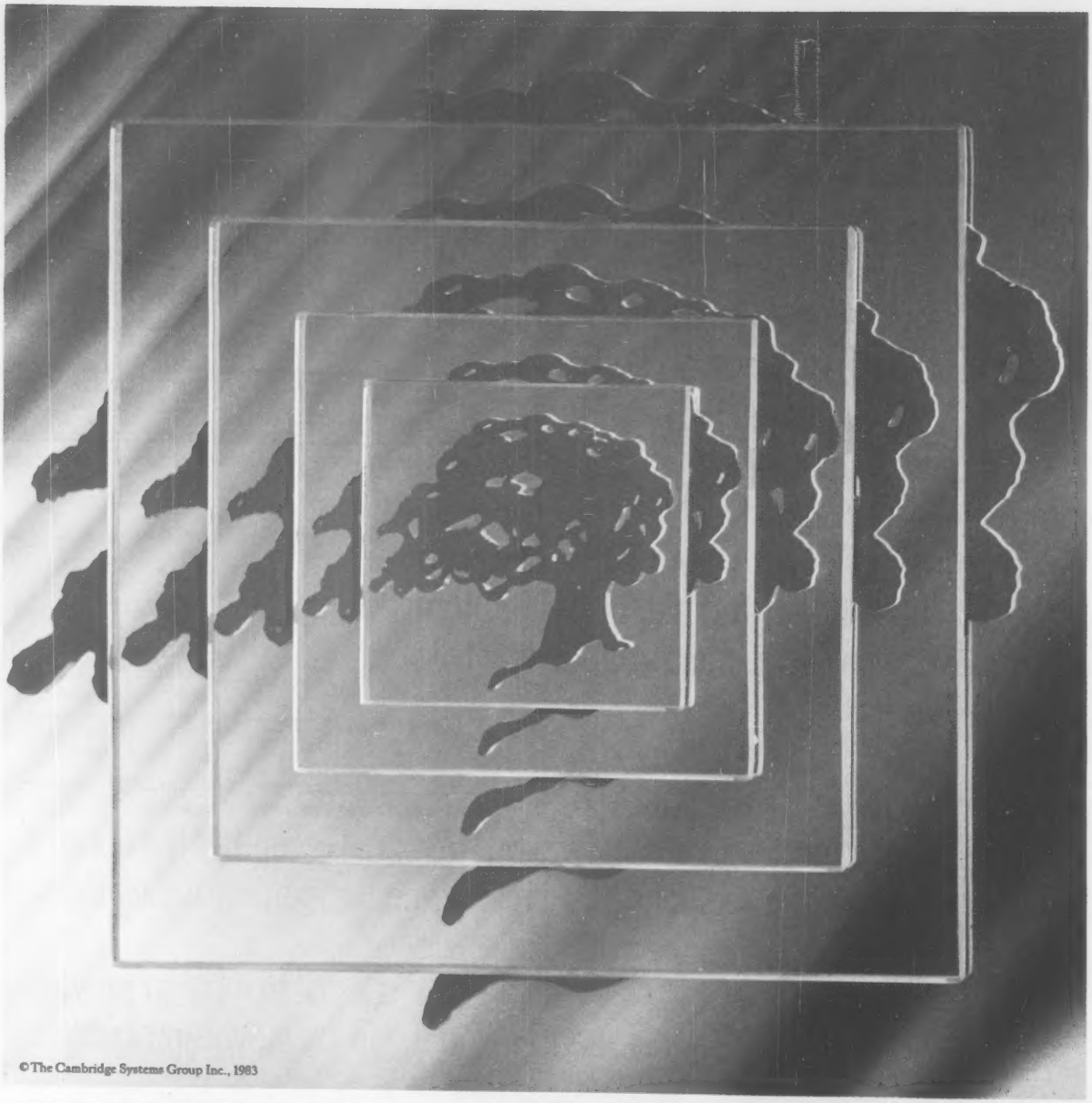
Because we also took the trouble to design our personal computers right in the first place.

RAINBOW 100 The low-cost, high-performance machine.

For a brochure on our three personal computers, call 1-800-DIGITAL. Or write: Digital Equipment Corporation, 200 Baker Avenue, Concord, MA 01742.

digital

Professional 350, DECmate, and Rainbow 100 are trademarks of Digital Equipment Corporation.
© Digital Equipment Corporation 1983



©The Cambridge Systems Group Inc., 1983

REFLECTIONS ON THE BEST IN SYSTEMS SOFTWARE

When 1300 IBM users worldwide needed high performance systems software for their OS/VS operating systems, they looked to the Cambridge Systems Group.

The reason is simple. Our ultra-sophisticated A**2 line of systems software, for DASD space management (ASM2), computer security (ACF2, marketed by Cambridge only in the United States and Canada) and job scheduling (ADC2), provides practical solutions to complex problems.

In just eight short years, we have proven that our systems software products work effectively in the most demanding IBM environments.

Finding solutions that manage and control OS/VS operating systems may not be easy, but a close look will tell you why others trust Cambridge. Now and in the future Cambridge software products reflect the highest standards in systems software.

The Cambridge Systems Group

CORPORATE HEADQUARTERS
THE CAMBRIDGE SYSTEMS GROUP, INC., 24275 ELISE, LOS ALTOS HILLS, CALIFORNIA 94022, TEL: (415) 941-4558 – TELEX: 357437
EUROPEAN OFFICES
FRANCE – TELEX: 697773 WEST GERMANY – TELEX: 523221 UNITED KINGDOM – TELEX: 299512

ACF2 is developed by SKK, Inc., Rosemont, Illinois

Separates Decision Support, Presentation Graphics

Graphics Software Mart on the Rise: IDC

By Bruce Hoard
CW Staff

FRAMINGHAM, Mass. — Business graphics can be divided into decision support graphics and presentation graphics, according to a recent report from International Data Corp. (IDC).

"Graphics in the Electronic Office Environment" states that while there is some overlapping between the two, decision support graphics can be thought of as the graphics representation of data to aid in its analysis. Presentation graphics are used in more formal settings for the presentation of the results of analysis.

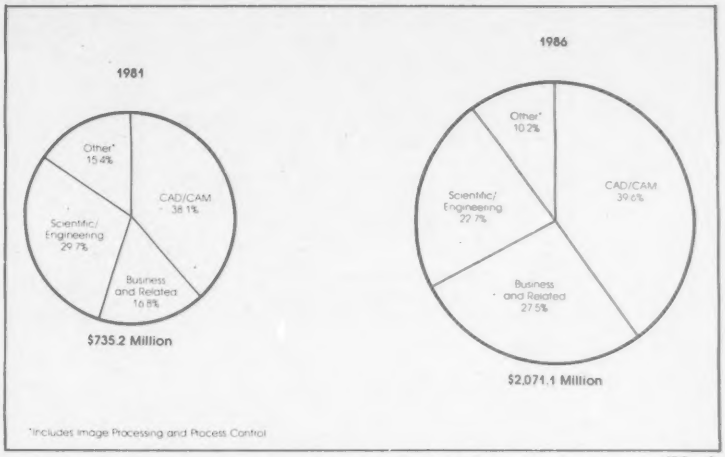
The study goes on to say that anyone in an information processing role in the office environment is a potential user of business graphics and penetration of that large market has hardly begun.

"Graphics software is one of the fastest growing segments of the general software marketplace, with a compound annual growth rate [1980-1986] of 56.6%," IDC said. Until recently, graphics software was restricted to mainframes and minis because of the size and processing demands of the application. Mainframe business graphics software is still a major marketplace, with offerings from IBM and other hardware manufacturers, as well as independents like Integrated Software Systems Co. and Precision Visuals, Inc.

Graphics software for desktop computers is also a fast-growing segment of the market, with many new packages having been introduced in the last year or two and more expected, the study said.

"The business graphics market actually consists of segments of various different markets, principally terminals and printers," the report noted. "Taken as a whole, the market is expected to grow at a compound rate of 35.7% from 1981-1986."

In the business graphics hardware area, the report discusses vendors and products in three categories: graphics workstations, hard-copy output devices and cameras.



U.S. Graphics Peripherals Market

Turning to integrated office graphics systems, the study notes there are many ways to offer graphics in the context of integrated office systems. They range from making available third-party graphics software to full-blown vendor-developed software and graphics output hardware.

"While the major part of the business graphics market is accounted for by hardware and software sold to end users, there is still a significant service bureau market," the study noted.

The nature of the business varies from bureau to bureau, but a general model is for an end user to submit data, either in hard copy for rekeying or via direct communications. The service bureau then processes the data and produces a graph of specified format, which is then turned into a slide, transparency or print that is shipped back to the end user.

Graphics systems should be user-friendly, able to be integrated with organizational data bases and offer high-quality, high-resolution output.

What the report refers to as "graphics education" is also important. Because most office workers have never been able to use graphics extensively, they are not trained to think in terms of what makes an effective graph. There is a tendency to pack in more data than can be comprehended and to rely on a particular format because it is familiar, not because it is the appropriate one for the information.

The 47-page study is available for $2,500 from IDC, Five Speen St., Framingham, Mass. 01701.

Electronic Mail Package Targets Prime Systems Running Primos

DETROIT — Creative Industries of Detroit, Inc. has introduced an electronic mail package for Prime Computer, Inc. computers running the Primos operating system.

CID Mail offers individual mailboxes the capability to send a letter to multiple users with one command, on-line documentation of all commands and the ability to mail binary files. Return receipt, letter labeling and a mail user directory are also provided, a vendor spokesman said.

Additional features allow letter transfers between networked Prime computers and letter encryption.

The package is available for $2,400 for a single CPU license and is available from Creative Industries of Detroit, 3080 E. Outer Drive, Detroit, Mich. 48234.

Executive Mouse Runs on Micros

REDWOOD CITY, Calif. — Product Associates, Inc. has announced the Executive Mouse, which can be used on most popular microcomputer systems.

The unit is completely contained and interfaces with a microcomputer as a supplementary keyboard.

The Executive Mouse is programmable and can be used with most software programs and microcomputers, as well as larger processors, the vendor spokesman said.

The unit is located between the CRT terminal and host processor, and cursor-control codes are automatically sent to the processor as the mouse moves. The unit also has three switches that are programmed to send delete character, delete word and perform special command functions, the vendor said.

The Executive Mouse costs $395 from the vendor at 465 Convention Way, Redwood City, Calif. 94063.

Northern Telecom Upgrades PBX

RICHARDSON, Texas — Northern Telecom, Inc. has introduced a new configuration of its SL-1M digital business communications system.

The SL-1M Executive Package is a private branch exchange (PBX) equipped with 40 SL-1 electronic telephone sets. The system was designed to meet the needs of the small and medium-size business market, especially companies with a large percentage of professionals such as legal firms and small banking outlets.

The price of the 40-line Executive Package is $25,348 or $634/line. The price varies depending on the choice of additional options. More information is available from Northern Telecom, 1001 E. Aparaho Road, Richardson, Texas 75081.

Gateway Link Eases OA Entry

NEWPORT BEACH, Calif. — Computer Development, Inc. has introduced a gateway link designed for multitasking, multiterminal, shared-resource access between computers with dissimilar protocols.

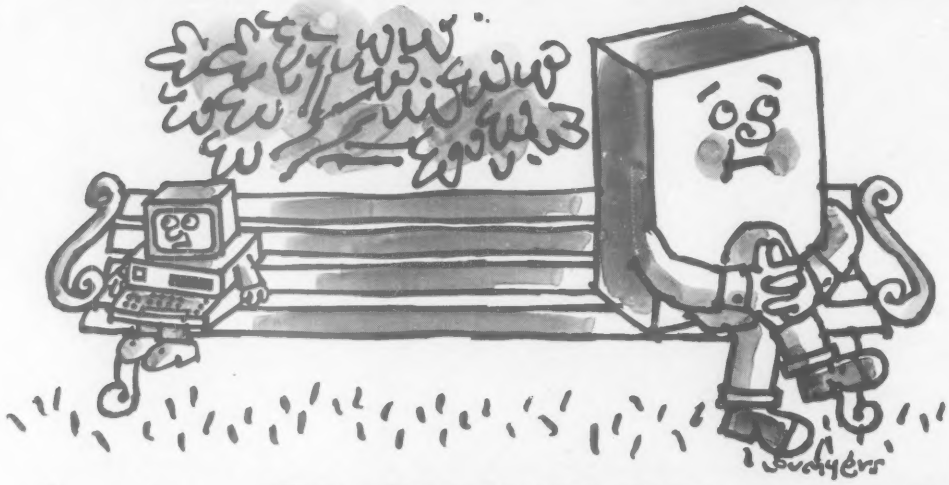
The link is said to allow easier entrance into office automation through electronic mail.

The Executive Telecommunications Controller 140 is a microprocessor-controlled, 103/202-compatible, autodial/autoanswer communications center with four terminal ports that can be configured for any CPU.

This is said to allow the connected terminals to access an intelligent modem, printer control buffer and other communications devices, according to a vendor spokesman for the firm.

The Executive Telecommunications Controller 140 is available for $1,595.

Computer Development is located at 151 Shipyard Way, Berth C, Cabin 2, Newport Beach, Calif. 92663.



Introducing OMNILINK™, the software that lets your IBM®/PC and mainframe understand each other.

The IBM Personal Computer has made a lot of friends in business. Unfortunately the IBM mainframe isn't one of them. Even though the two of them can be wired together, each has an operating system which the other can't quite understand.

That's why we created OMNILINK, a software package that lets your IBM Personal Computer and mainframe speak the same language.

Put the resource of your mainframe at your executives' fingertips.

OMNILINK lets your executives access and process information from the mainframe on their IBM Personal Computers. They can make decisions using complete, up-to-date information, and distribute the information to other people throughout your computer network.

English is no longer a foreign language.

Now you can get information without knowing a lot of codes or computer languages. You can ask questions in plain English using a PC. OMNILINK will get the information from the mainframe and present it in the format you need.

Electronic mail on a very personal level.

With OMNILINK your IBM Personal Computers can be used to send and receive messages, reports and data from any person, terminal, printer or word processor on the system.

You don't have to be a programmer to write a program.

Usually when you have a one time job to do, you have to wait for a special application program to be written. But with OMNILINK you can easily write the program yourself using a simple non-technical language.

Turn your PCs into WPs.

OMNILINK has integrated word processing capabilities built right into the system. You can pull information from the mainframe, draft your letters or documents, and electronically distribute them throughout your computer network. If you already have word processors, they can be tied into OMNILINK and be used for electronic mail.

Get your personal computers into pictures.

OMNILINK's graphic facility lets you turn piles of numbers or stacks of data into easy-to-understand graphs and charts. OMNILINK even lets you add the graphics to documents or send them to other PCs.

Spreadsheets also come standard.

You can use the information in your mainframe to work spreadsheets on your personal computer. Any executive with a PC can revise business plans, sales trends, etc. in seconds instead of days.

OMNIGUARD security software option.

Now that so many people will be benefiting from the resources of your mainframe, security is more important than ever. OMNIGUARD security software protects all aspects of your computer system.

Make your IBM Personal Computers and mainframe one big happy family.

Contact On-Line Software International today about OMNILINK and dramatically increase the capabilities of your personal computers. It's about time your IBM Personal Computers and mainframe had a more productive relationship.

OMNILINK from ON-LINE SOFTWARE INTERNATIONAL

Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0009, Toll Free (800) 526-0272

Come talk to us about Omnilink at NCC, Booths 5609-5610.

IBM and IBM Personal Computer are trademarks of International Business Machines Corporation. Certain components of OMNILINK are products of either Softrend, Inc. or Datascan America, Inc.

WP System Monitors Purchases for Light Firm

By Robert Batt
CW West Coast Bureau

MORRISTOWN, N.J. — In supplying the electricity needs of its 700,000 customers, the Jersey Central Power and Light Co. (JCP&L) recognized a need to converge its text and data processing requirements.

Nowhere was this more apparent than in the company's purchasing department, which for many years survived with a cumbersome and labor-intensive floppy disk storage and retrieval system.

By the late '70s, this system had become so saturated that the output of timely information became impossible.

Search Begins

The company began to look around for a word processing system that would fit its requirements, which included the processing of a purchase requisition from the time of its receipt in the purchasing department to receipt of the needed goods and services.

Such a system needed to be on-line from the time of the initial entry of the purchase requisition into the system file. Ideally, pertinent data would be captured only once, retained and then perpetuated by the system. Data such as vendor names and addresses and purchase descriptions for inventory material would be permanently stored and retrievable for use.

JCP&L also wanted the system to be able to retrieve pertinent data for management in both fixed and variable report formats.

Data processing executives listed their requirements for the intended system. These included:

- 60M bytes of both on-line and backup storage.
- Sorting and security capabilities.
- Eight workstations that could be expanded when needed.
- Communications capability with the company's IBM 3081 mainframe computer.

After a six-month search, the company opted for a Wang Laboratories, Inc. OIS 140 Model 3 system. According to company officials, Wang software weighed heavily in the selection process. The glossary, list processing and basic language packages, they claimed, were especially pertinent to JCP&L's planned use of the equipment.

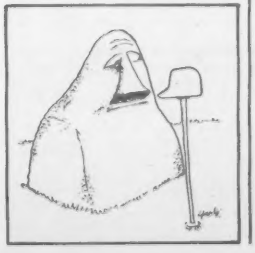
The Wang system is now being used by JCP&L to monitor its minority business procurement program, among others. Each purchase order awarded to a minority supplier is coded, and a track is kept of how many dollars have been awarded to minority businesses and when the awards were made.

Other functions on the Wang system include requisition generation, creation of requests for quotations printing official purchase orders, a vendor history file, a dollar commitment register and a program that monitors buyer work loads and indicates how many purchases and dollars are being handled by each buyer.

According to Clement Du-Fresne, vice-president for materials and services, this latter program enables the purchasing department to monitor continually and manage its work load.

"The system met my time frames for on-line productivity. This was all the more remarkable when you consider that we initially had no trained personnel. Today we can take someone with no prior skill and turn him into a real pro in a month or less," he said.

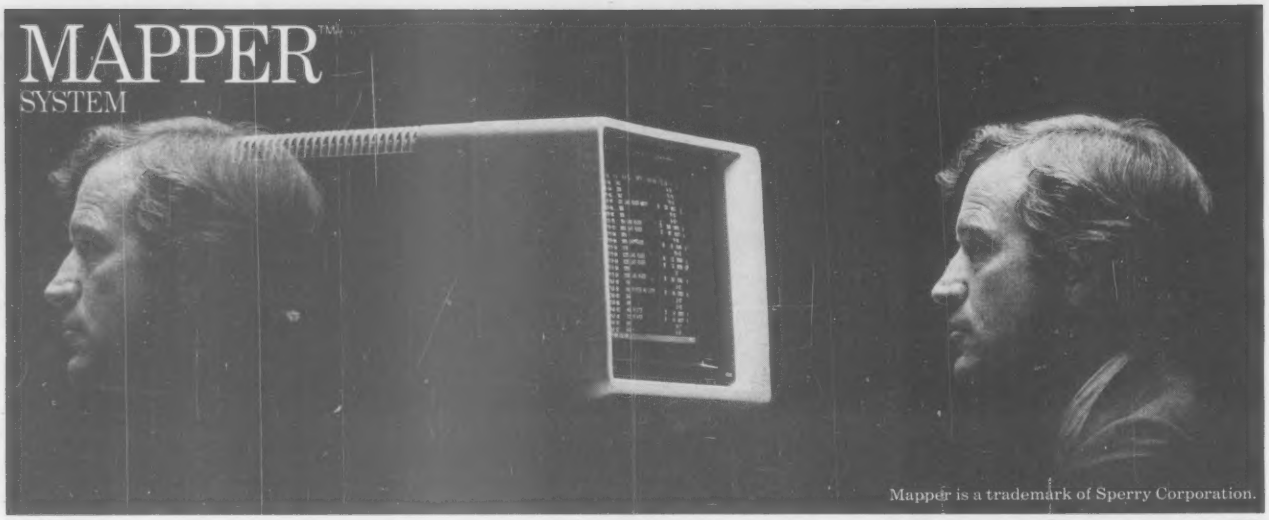
The OIS 140 has been upgraded to an OIS System 145, and its use has spread to other departments within the company. The Legal and Human Resources Department has now purchased its own system.



SCAN/370—The system that automatically simulates the execution of every cleanly compiled COBOL program. SCAN/370 gives you critical analysis information that reveals how each program will execute at run time—information not obtainable via cross referencers, flowcharters, or other analysis tools.

SCAN/370

SCAN/370 is a comprehensive COBOL enhancement system designed to speed the development and maintenance of COBOL programs and improve their operational reliability.
MAINTENANCE AND DEVELOPMENT PRODUCTIVITY: Isolates problem areas in COBOL programs—before testing. Simplifies resolution of compiler diagnostics. Removes the drudgery from new program development. Reduces the time required to analyze COBOL programs.
PROGRAM RELIABILITY: Detects and flags latent bugs in production programs—before they happen. Highlights maintenance booby-traps.
DYNAMIC PROGRAM DOCUMENTATION: Generates concise and accurate program level documentation. Recreates documentation automatically with every clean compilation.
QUALITY ASSURANCE: Graphically distinguishes well structured code versus poorly structured code. Detects and flags COBOL keywords that do not conform to user defined restrictions.
EDP AUDITING: Documents the differences between two versions of the same COBOL program.
SYSTEM RESOURCE SAVINGS: Saves millions of lines of computer output every single month. Reduces the load on your teleprocessing network.
OPERATING ENVIRONMENT: IBM 360/370 and compatible systems.
GROUP OPERATIONS, INCORPORATED
1110 Vermont Ave., N.W. Washington, D.C. 20005 (202) 887-5420
Offices in: Boston, Chicago, Cleveland, Columbia, S.C., Dallas, Los Angeles and New York.



©Sperry Corporation, 1983

How to make a computer think the way you do.

Computers don't actually think, of course. But it is possible to make it seem that they do.

Which is precisely what Sperry has done with the MAPPER™ System.

Traditional information systems work on the assumption that all the specifications for information are known and can be programmed. But human thought is not so neatly linear or disciplined.

Decision-making is an exploratory process. Information is gathered, then examined. This, more often than not, leads to the need for new information not previously anticipated.

MAPPER makes the computer follow your natural thought process in just that way.

As you examine various alternatives, you decide what information you need. Previous results, not rigidly programmed procedures, determine what you ask the computer to do next.

You spend less time gathering information, so you have more time to work with it. More time to consider options and "what if" scenarios.

And because information can be made available wherever it's needed, MAPPER can mean higher productivity from the top on down.

MAPPER. For more information, call us toll-free: 800-523-2496 (9 a.m. to 5 p.m. E.D.T.). In Pa call collect: 215-646-3378. Or use the coupon.

Sperry Corporation
Computer Systems, Department 100
P.O. Box 500
Blue Bell, PA 19424
Please send me information on the MAPPER™ System.

Name _____ Title _____
Company _____
Street _____
City _____ State _____ Zip _____

CW 5/16

SPERRY

See the Sperry Mapper System in action at NCC, Booth S5462.

We understand how important it is to listen.

CW Photo by L. Paul

James E. Grinnell

DMS' Strategy: New Packaging Yields Customers

By Lois Paul
CW Staff

LEXINGTON, Mass. — James E. Grinnell seems uniquely qualified to serve as president of Distribution Management Systems, Inc. (DMS), a company that provides turnkey systems and software for managing distribution and warehouse functions.

Until last December, he was vice-president and general manager of Polaroid Corp.'s worldwide distribution division, with overall responsibility for 240 people. In addition, he was a user of the DMS-1000 Distribution Management System. As such, Grinnell had experienced the contest that often arises between sales and manufacturing when a company is determining how many

(Continued on Page 140)

IBM Seizes Second Place In CAD/CAM Revenues

By Ed Scannell
CW Staff

RYE BROOK, N.Y. — By providing users of turnkey computer-aided design and manufacturing (CAD/CAM) systems with sophisticated software upgrades over the past three years, IBM has quietly slipped past Applicon, Inc., Calma Co. and Autotrol Technology Corp. and into second place behind Computervision Corp. in total CAD/CAM revenues.

From 1980 through 1982, IBM's CAD/CAM revenues rose from $40 million or 12% of the market to $225 million and a 20% market share, according to Merrill, Lynch, Pierce, Fenner and Smith, Inc. IBM is expected to increase its CAD/CAM revenues to $305 million and at least maintain its 20% share in 1983, a Merrill Lynch spokesman said.

Perhaps the most significant aspect of IBM's CAD/CAM success, particularly in the mechanical design portion of the CAD market where it owns a 35% share, is that it has only one dedicated monochrome terminal, the 3250. What has enabled the company to leapfrog past some of the heavyweight suppliers of CAD/CAM products over the past three years is its

(Continued on Page 146)

An IBM industry manager documented the company's increased commitment to the CAD/CAM market by pointing to the formation last year of a 'several-hundred-person' group within IBM that is dedicated solely to producing CAD/CAM products.

To Win High-Tech 'War' With Japan

Sen.: U.S. Must Support R&D

By Bill Laberis
CW Staff

FRAMINGHAM, Mass. — The U.S. has exhibited a "mortician's view" of industrial growth in shoring up dying industries. The Japanese, on the other hand, have employed a "sunrise" approach to industrialization that both favors its high-technology sector and threatens to destroy the U.S. economically.

This was the guts of a message delivered here recently by U.S. Sen. Paul Tsongas (D-Mass.), speaking before a group of 175 electronics industry executives at a symposium entitled "The Small Systems Economy: Crisis and Opportunity," which was sponsored by the Interface Group.

The Japanese, Tsongas said, have followed a "Darwinian" road to post-World

(Continued on Page 142)

CW Photo by B. Laberis

Sen. Paul Tsongas

Japan to Play Influential Role In Business Graphics, Exec Says

By Robert Batt
CW West Coast Bureau

SAN DIEGO, Calif— The Japanese computer industry will play a far more influential role in the future growth of business graphics than it has in the past, an industry consultant said here recently.

Carl Machover, president of Machover Associates Corp., White Plains, N.Y., said Japanese manufacturers will be particularly strong in the area of computer-aided design and manufacturing (CAD/CAM).

In an opening address to the Fifth Annual Conference on Computer Graphics '83, sponsored by Frost & Sullivan, Inc.,

(Continued on Page 154)

Coverage of Computer Graphics '83 continues on Page 155.

A Simon Legree for Computers

The Beall Channel Switch. Makes computers, peripherals work harder, more effectively. Directs critical on-line services to another CPU when failure occurs. Commands specific peripherals to serve more than one computer. Redrives all CPU signals to give far more flexibility in physical placement of peripherals.

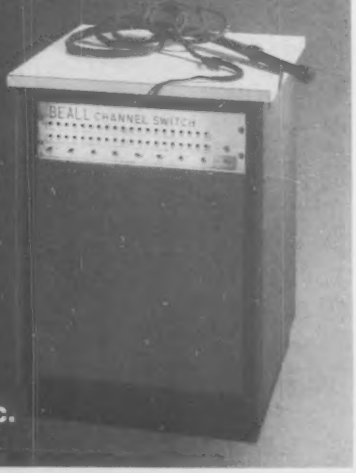
And Beall does all of this less expensively, more reliably and with less opportunity for operator confusion than anyone else.

We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs.

Want to whip up more facts? They're in our new brochure. Write or call for it today.

John Beall & Company, Inc.

9183 Third Avenue • North Bergen, N.J. 07047 U.S.A. • 201/854-3562



DMS' Plan: New Packaging Yields Customers

(Continued from Page 139)

finished goods it will have available and when these can be shipped.

Before he began using the DMS distribution system, he said, salesmen at Polaroid deve'.oped a forecast and gave it to manufacturing to be used as a production vehicle. "If you had back orders, it was manufacturing's fault. In high inventory, it was sales' fault," he explained.

Instead of determining "how many widgets you are going to sell" and making this the production plan, he explained, the DMS-1000 system is designed to determine what is in the distribution pipeline today and to answer such questions as, "How long does it take you to move it out to your distribution centers? How much product do you need and where are you going to warehouse it?"

Until recently, the DMS-1000 Distribution Management System and the DMS-1500 Warehouse Management System were sold as complete customized hardware/software systems based on Digital Equipment Corp.'s VAX line of minicomputers. DMS is an authorized DEC distributor, and customers can purchase their hardware through DMS or directly from DEC.

Five months ago, the firm entered a new phase, announcing that it would offer both products on a stand-alone basis for use on DEC VAX equipment. Frank Buda, senior marketing representative for DMS, said the availability of these packages has provided the firm with "more prospects than we ever had before. We see that market opening us up to companies that we weren't able to penetrate before." The lower price tag of a software-only system is allowing DMS to target its products at entry-level sites.

A further step DMS is undertaking is the conversion of its software to Cobol for use on IBM mainframes. Grinnell said he expects to have the baseline DMS-1000 product converted to Cobol by September for beta testing. "It will look the same as the product does today in terms of features and functions."

CW Photo by L. Paul

Frank Buda

Grinnell said one reason for the move to IBM equipment is that a number of potential clients have looked at the DEC-based products and said, "If you only had this kind of thing in an IBM environment it would be super." The IBM product will be targeted at the 4300 series and up, mosf likely running under OS with CICS. Grinnell views this as an additional flexiblity for his potential customers.

"If you want to go distributed, you would use the DEC. If you want to interface with a host with the same functionality, then you can go to the IBM," he said. "Also, it will give us the capabilty to interact directly with IBM or remotely through a mini and will look the same to the user. So as the technology changes, it will give us real flexibility to build in either direction," he added.

The seven-year-old, privately held firm has more than 140 hardware/software systems installed in 14 countries. Thirty of these customers are Fortune 1000 corporations. Company revenues increased from $1.2 million in fiscal 1977 to $10.9 million in fiscal 1981. Grinnell said growth had been about 75% per year until about 1981, when it began to flatten out. In October 1982, DMS received $2.2 million in venture capital from the Palmer Organization L.P., Fidelity Ventures Ltd., Funds for Industry, Rhode Island Hospital Trust Capital Corp., New England Capital Corp., MIT and Investor Associates.

NCR Unwraps Ethernet Rival

NEW YORK — NCR Corp. and Intel Corp. have announced a local-area networking capability that will reportedly be similar to, but less sophisticated, one-fifth as expensive and slower than Xerox Corp.'s Ethernet.

Mid-range local-area network (Mirlan) will be a 1M bit/sec baseband local-area network featuring the carrier-sense multiple access with collision detect line access method favored by the Institute of Electrical and Electronics Engineers for baseband networks.

Intel is contributing its very large-scale integration expertise by developing a semiconductor controller similar to the one used by Ethernet. NCR is working on a transceiver. An NCR spokesman claimed these products will be available "later this year."

More information is available from NCR at 1700 S. Patterson Blvd, Dayton, Ohio 45479.

QUADRAM™ INAUGURATES THE

Use Apple software in your IBM PC and XT
Who said you can't mix Apples and IBMs? Innovation by Quadram makes it possible with Quadlink.™ A simulated Apple computer on a revolutionary new enhancement board.

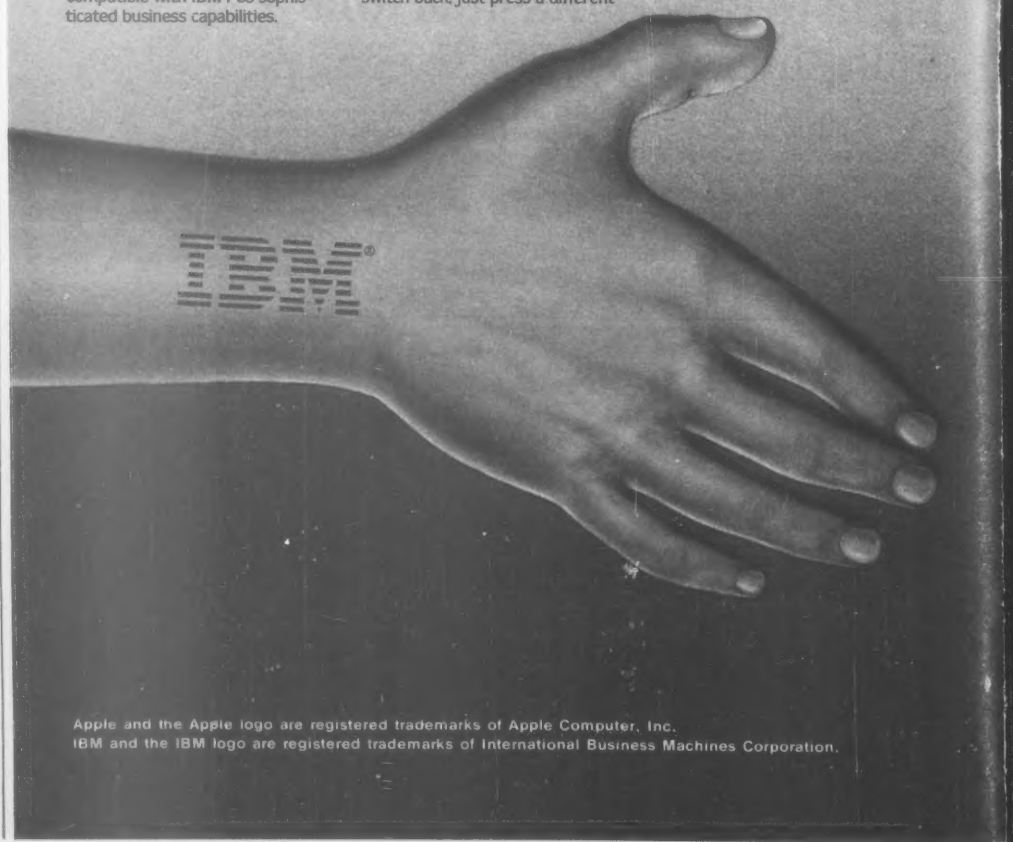
Most programs designed for the Apple II, II Plus or IIe — including educational software and entertainment options — are now compatible with IBM PCs sophisticated business capabilities.

That's right. An Apple and an IBM. In one computer with no software limitations. Quadlink by Quadram opens a whole new world of possibilities.

Easy to use
Quadlink plugs inside IBM PCs. No conversion or reformatting of diskettes needed. Just load Apple software in the IBM and key one command. That puts you in the Apple mode. When ready to switch back, just press a different key. It's that simple. Like having an Apple 64K computer inside your IBM.

Keep the extras
Quadlink allows use of all IBM enhancements while running Apple software. Printers, buffers, monitors and more.

When using a monitor there's no plugging or unplugging cables. Apple programs will appear on an



Apple and the Apple logo are registered trademarks of Apple Computer, Inc.
IBM and the IBM logo are registered trademarks of International Business Machines Corporation.

DMS Head Attributes Firm's Success to Distribution

LEXINGTON, Mass. — Explaining the success of the seven-year-old Distribution Management Systems, Inc. (DMS), which he joined last year as president, James E. Grinnell said in a recent interview, "Distribution is the jewel that really hasn't been fully discovered.

"People talk today about materials management and logistics planning. The real entry into that, we think, is through distribution back into the manufacturing end of purchasing," he explained.

"We are starting in the distribution area and generating information at sufficient enough detail to provide input to optimizing that whole logistics flow. If you can get a customer that can get the manufacturing and procurement working at exactly the same speed — the sales are working in and the resources are planned at that level — you really can be extremely profitable," he added.

Frank Buda, senior marketing representative for DMS, said that in the past 20 years there has been a lot of manufacturing software available, but not a lot of distribution software.

"One reason is that distribution, more than any other area of the business, represents the uniqueness of the business in terms of marketing strategies, products, pricing and distribution channels," he said.

According to Buda, the major competitors DMS has faced have been the in-house alternative as well as the offerings of hardware vendors. He noted that only a handful of large mainframe-based packaged solutions are available from independent software vendors.

Grinnell said that as former vice-president and general manager of Polaroid Corp.'s worldwide distribution division, which used the DMS-1000 Distribution Management System, he recognized that the DMS product differed from standard in-house management information system approaches in that it was designed to enable users to become involved with the process immediately. "We didn't design the food that the cats would like from a remote location," he said. "We were there when the cats were sampling as we went along," he said.

MCI Posts Record Profits, Revenues in Last Quarter

WASHINGTON, D.C. — MCI Communications Corp., the company that has captured more than one million long-distance telephone customers by undercutting AT&T, has reported record revenues and profits in its most recent quarter.

Profits rose 57% to $53 million or 48 cents per share, up from earnings of $34 million a year ago. Quarterly revenues meanwhile more than doubled to $331 million, compared with sales of $165 million the same quarter a year ago.

Revenues for the year ending March 31 topped the $1 billion level for the first time, reaching $1.07 billion, up from fiscal 1982 revenues of $506 million. Earnings in the year just completed were pegged at $171 million or $1.69 per share, a 98% increase over 1982's $87 million profits figure, the company reported.

Commenting on the company's rapid growth, William G. McGowan, MCI chairman, said the court-ordered divestiture of AT&T's local phone companies and other regulatory actions of the federal government have presented "major opportunities for further expansion of MCI's market share."

Injunction Issued Against Selling Apple Doubles

CUPERTINO, Calif. — Apple Computer, Inc. has been awarded a preliminary injunction issued against a Los Angeles microcomputer and peripherals distributor enjoining the latter from selling its Apple II look-alikes in the U.S.

Formula International had been selling the Pineapple computer, largely by mail order, prior to the May 2 injunction issued by U.S. District Court Judge Irving Hill. Hill specifically included Apple's Autostart read-only memory (ROM), Applesoft package, DOS 3.3 and Integer Basic in his injunction.

Hill concluded that Apple's U.S. copyright statutes cover programs stored in a computer's ROM components, whether in object or source code.

Hill said further that Congress intended to include operating system software under the protection granted by U.S. copyright laws.

A similar suit Apple filed against Franklin Computer Corp. is now pending before the Third Circuit Court of Appeals in Philadelphia. A lower court judge in that case ruled that the intent of Congress is unclear regarding the protection of software granted by copyright laws.

MERGER OF APPLE AND IBM

IBM monochrome or color monitor, like Quadram's chrome vivid RGB color monitor Quadchrome, more clearly than Apple's own screen — even while working with Apple's high resolution color graphics.

Explore your options
Quadlink comes standard with 64K memory. Requiring only one expansion slot, it offers a game port and works with all I/O devices designed to enhance the IBM PC. Like parallel and serial ports for operating printers, modems and other peripheral accessories. There's nothing like Quadlink. And nothing like reliable Quadram Quality to stand behind it.

Quadram Corporation is an Intelligent Systems Company. For over a decade, ISC has been an innovator in personal computer enhancements and color graphics peripherals.

Quadram products are available only through authorized dealers worldwide. Visit one and ask for a demonstration of Quadlink. Priced at only $680, we think you'll like what we've discovered.

Check on our other enhancements too, especially Quadboard, the original multifunction board for the IBM PC.

QUADRAM CORPORATION
An Intelligent Systems Company

4357 Park Drive / Norcross, Ga. 30093 / (404) 923-6666
TWX 810-766-4915 (QUADRAM NCRS)

Available for delivery to retail stores worldwide in late June.

SEE US AT NCC BOOTH #D1050

FOCUS
on your INFORMATION CENTER
ENSURE END USER SUCCESS BY
"USING FOCUS"
A CAI COURSE WRITTEN BY GARY DeWARD BROWN
AUTHOR OF "USING SAS"

CRWTH COMPUTER COURSEWARES
613 WILSHIRE BLVD., SUITE 200
SANTA MONICA, CA 90401
(213) 391-6788 1-800-282-2372

Yes, send me information on USING FOCUS
COMPANY
NAME TITLE
ADDRESS
PHONE
*FOCUS is a copyrighted product of Information Builders Inc.

Sen. Urges U.S. To Spend More on High-Tech R&D

(Continued from Page 139)

War II reindustrialization, directing scarce capital and government resources toward incubating those industries in which they could be most competitive.

The result, the senator continued, is that Japan today offers an educational system and industrial infrastructure that the U.S. should emulate, but is failing to do.

"We need a realization that we are in trouble . . . We're lacking a sense of urgency," Tsongas explained. "We don't have an administration or Congress in this country that seems to be intent upon being competitive, but rather has an undue commitment and reliance on the laissez-faire system undirected in competing with Japan. I believe we should have faith in our system, but we should understand the need for change as well."

'We need a realization that we are in trouble . . . We don't have an administration or Congress in this country that seems to be intent upon being competitive, but rather has an undue commitment and reliance on the laissez-faire system undirected in competing with Japan.' — Sen. Paul Tsongas

Tsongas offered a multipoint program to get America back on a competitive track, a program he is pushing with the influence and clout he wields as a member of several important Senate committees. He is a member of the Foreign Relations Committee, the Senate Export Caucus and a small business subcommittee.

First, he said, the U.S. as a government and industrial power should commit itself to spending 3% of its $3 trillion gross national product (GNP) to research and development, about double that spent in 1982. Tsongas claimed that Japan has committed a similar percentage of GNP to research and development, as have the UK and France.

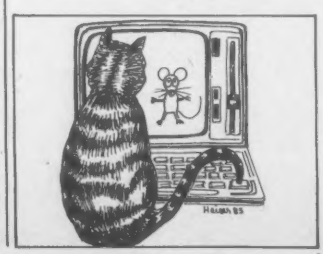
But, Tsongas said, the U.S. should find some middle ground between the totally state-directed French version of R&D spending and the free-market approach now followed in this country.

Second, Tsongas said he will join a host of other congressmen in pushing for passage of the High-Technology Morrill Act during the current session of Congress. The act calls for the federal government to spend up to $500 million annually in matching grants for higher education and private R&D. He rated the bill's chance of passage as "good."

And in a departure from the usual liberal Democratic line, Tsongas charged that current antitrust laws are outdated. Private industry, he said, must be permitted to "collude" to be competitive with the Japanese in the long term.

Labeling U.S. competition with the Japanese a "war," Tsongas said, "If they produce more engineers than we do, commit 3% of their GNP to R&D and we don't have a better education system and lower capital costs, there is an inevitability of their ascendancy and of our decline.

"We cannot wait until our high-tech industries are in the same place as textiles, autos and steel."



DIGITAL'S VAX™
PLUS
RAMTEK'S MARQUIS™
EQUALS:
THE BEST ENGINEERING
INVESTMENT YOU CAN MAKE.

A cooperative agreement between Digital Equipment Corporation and Ramtek has brought together the industry standard Digital VAX super minicomputer and the state-of-the-art Ramtek MARQUIS colorgraphic terminal in a single hardware engineering system.

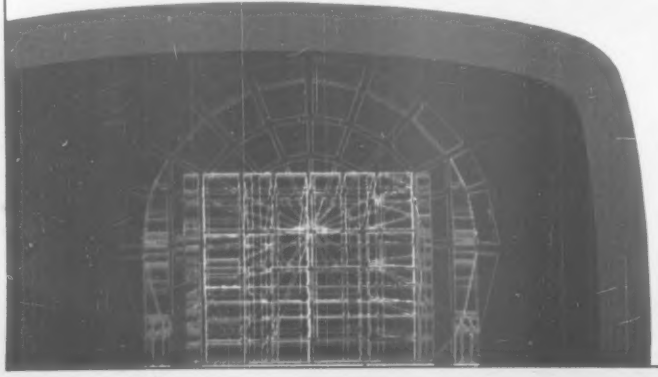
Digital's VAX 32-bit super minicomputers are among the most popular computers for engineering applications. And Ramtek's MARQUIS Graphic Workstation, based on the powerful MC68000 microprocessor, provides single or dual workstations with 1280 X 1024 resolution and up to 16 million colors.

The MARQUIS and the VAX combine to provide an ideal hardware solution for your engineering application whether it's mechanical design and drafting, printed circuit board and VLSI data capture and layout, or architectural design. Every system comes complete with VAX/VMS, MARQUIS, tablet, puck, keyboard and high-resolution raster scan monitor. And, of course, service, support and training are available.

Invest in a phone call today to Digital (617) 467-6000 or Ramtek (408) 988-0320. It's one investment designed to return dividends for years to come.

digital
Digital Equipment Corporation
Engineering Systems Group
Two Iron Way
Marlboro, MA 01752

Ramtek
Ramtek Corporation
2211 Lawson Lane
Santa Clara, CA 95050



Satellite dish display created by PATRAN-G, a product of PDA Engineering.

One simple RPG II conversion to Wang can turn a system you've outgrown into a system you can't outgrow.

If you're currently considering a conversion from an IBM System 34 or similar environment, Wang has a better way to go. And a better way to grow.

The Wang RPG II Conversion Aid Package and the Wang VS family of 16- and 32-bit computers.

This package offers a fast, easy approach to system conversion. It's end-user oriented, menu-driven, and requires so little time and trouble, it's easily cost-justified.

But best of all, the RPG II package opens up an almost limitless growth path into the Wang VS line—a line that's expandable, upgradeable and integrated from low to high end. And because all VS computers run on compatible operating systems and support the same applications software, the hassle of computer conversions is a thing of the past.

If you're facing a computer conversion because you've outgrown your present computer system, take the growth path with the future built in. The Wang RPG II Conversion Aid Package and the Wang VS line of computers.

For more information about the Wang RPG II Conversion Aid Package, call

1-800-225-9264

or send this coupon to:
Wang Laboratories, Inc.
Business Executive Center
One Industrial Avenue
Lowell, MA 01851.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

( ) _____
Telephone

A791

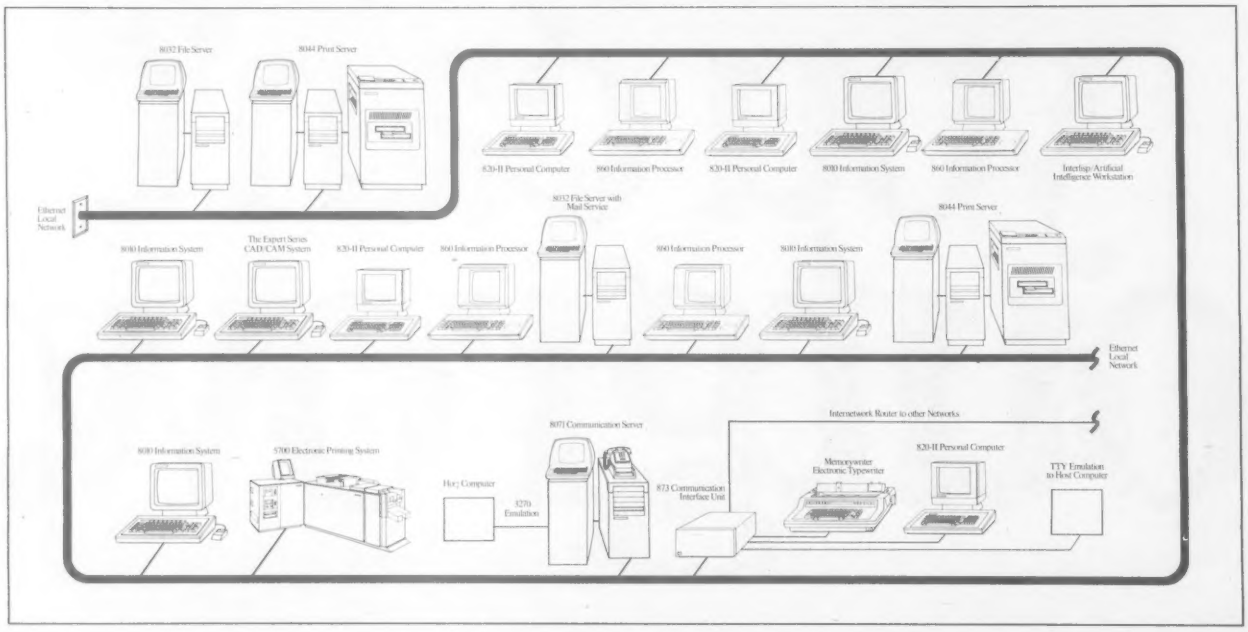
WANG

The Office Automation Computer Company

© 1983 Wang Laboratories, Inc.

XEROX

At last, teamwork like this for your office machines.



Introducing Team Xerox.

Team Xerox could be your office's most powerful force for greater productivity and operational efficiency.

If you've looked at other networks, you know that few of them even come close to the scope and versatility of Team Xerox, as pictured in the illustration above.

With Team Xerox, using an 8010 workstation, you can create charts and graphs on the spot and hook up with several kinds of printers. You can transmit reports and do your work in nine languages, including Japanese.

With the same 8010, you can collect or share data from other 8010s, from mainframes, computers, other workstations and even other networks. You can also exchange messages with communicating Memorywriters.

Team Xerox is infinitely adaptable to your needs. You can start with a few machines and add more as you go along. With Team Xerox you can actually tailor a system to your needs. You can operate within a single office or in dozens of branches, nationwide.

The Ethernet cable that links the system together has a bus-type topology—you can tap in wherever you wish—and does not require a central controller. And since Ethernet is an industry standard, more and more hardware and software, from Xerox and other companies, is being built or adapted to connect with Team Xerox.

Whether you're in business, science, government or academia, call your Xerox Office Systems sales office and learn how Team Xerox can make your work easier, more efficient and more productive.

And that, after all, is the value of teamwork.

XEROX® is a trademark of XEROX CORPORATION

On Expanded Bank Services

Federal Court Hears DP Services-Bank Debate

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The long-running battle between the DP services and banking industries over banks' plans to enter the DP business passed another milestone recently when a federal court here heard arguments on the government's decision to allow the expanded bank services.

The hearing before a three-judge panel of the federal appeals court was essentially a repeat of an earlier, protracted proceeding before the Federal Reserve Board, which last year decided to allow Citicorp and other large banking holding companies more freedom to offer DP services [CW, April 12, 1982]. Attorneys for the Association of Data Processing Service Organizations, Inc. (Adapso) told the court April 26 that the Fed had exceeded its statutory authority under applicable banking laws.

The issue was elevated to this court case when Adapso appealed the Fed's decision after failing to get that agency to modify its ruling acceptably. The association is asking the court to overturn the ruling, but at the recent hearing the panel made no immediate decision.

Adapso contends the new banking services are not closely related to traditional banking business under the definition as contained in laws regulating what services banks may offer, and that they would be unfair competition for existing DP services firms because of the size and strength of banking holding companies such as Citicorp. Also, the association suggests that banks, which are heavily regulated, could unfairly subsidize their DP operations with income from their main-line banking services.

Citicorp, which is at the center of the dispute because of its ambitious plans for a DP subsidiary to offer, among other things, banking at home and data base access services, maintains the new services are merely banks' efforts to exploit modern technology in the provision of traditional financial services. The new services are necessary, Citicorp attorneys further argue, if banks are to survive in the present, deregulated environment that finds such unlikely companies, including brokerage houses and retailers such as Sears Roebuck & Co., offering sophisticated financial services.

Adapso counsel Michael Nugent told the appeals court that the Fed exceeded its authority in deciding in Citicorp's favor last year. He also argued that the Fed erred, in part, because it based its decision on the fact that the data to be processed in the new banking services is financial and economic data. That "data test is a meaningless test," he told the court.

The fact that the data is economic does not make the services traditional to banking, he said. Nugent suggested such a test would allow services such as strategic planning and marketing, which are "general-purpose data processing services having no relation to banking."

He said although banks might in the past have offered such services to their customers on an informal and occasional basis, the Citicorp plans constitute a new "ongoing business venture" unrelated to previous customer services.

Judge Antonin Scalia, however, viewed Nugent's arguments skeptically, asking him in reference to this new type of service, "Is it new or is it just more efficient?" The judge suggested Adapso had not shown conclusively that Citicorp's plans are unacceptably unrelated to traditional banking services.

Similarly, Richard A. Whiting, an attorney representing Citicorp, countered that Nugent's argument "is little more than a play on words."

Integral Data Systems introduces you to Prism Printer™ affordable color printing.

The PRISM PRINTER™ just rewrote the primer on hard copy output. It transforms dull statistical data into crisp, colorful output. Your text, charts and graphs will come to life in full color.

PRISM color makes the most complex data elementary. It does for information processing what instant color film did for photography: it makes getting the picture faster and easier. And communicates your information more effectively.

But today's most important lesson is that for the first time, color printing is affordable. Now. At a fraction of the price you'd expect. The PRISM PRINTER, by Integral Data Systems. It'll help you keep the cost of color inside your bottom line.

For more information call toll free (800) 258-1386 (in N.H., Alaska, and Hawaii, call (603) 673-9100).

Integral Data Systems, Inc.
A Whole New Spectrum of Imaging Ideas
Milford, NH 03055 Telex 95 4032
SEE US AT BOOTH #A3101 AT NCC '83

Crayola is a trademark of the Binney & Smith Co., Inc.

Study Cites $262 Million CAD/CAM Trade Surplus

WELLESLEY, Mass. — The combined U.S. exports of factory automation systems, valued at $322 million in 1981 vs. $60 million worth of system imports, resulted in a $262 million trade surplus, according to a report released by Venture Development Corp.

U.S. manufacturers of computer-aided design and manufacturing (CAD/CAM) systems have been the most successful in satisfying the worldwide appetite for factory automation, according to the report entitled "The Factory of the Future: A Strategic Analysis."

The $291 million worth of exported CAD/CAM systems reportedly dwarfs export shipments of U.S.-produced robots and numerical controllers. Also, U.S. CAD/CAM imports appear negligible at present. This imbalance of exports and imports indicates the considerable technological strength of U.S. manufacturers in foreign CAD/CAM markets, according to the report.

In contrast, U.S. efforts to serve world markets for industrial robots have been far less successful. Only $19 million worth of robots were exported in 1981. Stacked against $11 million worth of imports, the net export was only $8 million.

There was a $37 million trade deficit posted by numerical controllers in 1981, the report said. While $12 million worth of numerical control systems was exported in 1981, $49 million in such systems was imported.

The Japanese share of the U.S. numerical controller market is expected to continue to increase for several more years, the report said. To do this, Japanese manufacturers will rely on increasing economies of scale as production volumes escalate.

The report costs $2,490 from Venture Development at 1 Washington St., Wellesley, Mass. 02181.

IBM Steals Second Place In CAD/CAM Revenues

(Continued from Page 139)

high-end software and networking capabilities, which provide users with an integrated system, according to John Spivak, industry manager of IBM's CAD/CAM support centers.

"A large part of our strength comes from the fact that we can offer an integrated CAD/CAM system," Spivak said, "integrated in the sense that one can do a preliminary three-dimensional design and then feed that design to an analysis program using the same system.

"Those analysis programs are big CPU burners, and you probably would not run them on a mini-type computer; you would be better off with an integrated system that allows you to do it all in one spot. By using one computer you don't have to carry tapes back and forth and worry about cross talk between two computers," he said.

Spivak said IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) networking capability is another reason for IBM's CAD/CAM success. While the IBM 4341 has been the most popular mainframe for CAD/CAM applications, Spivak said the SNA/SDLC links tie the 3250 to all mainframes from the 4321 to the 3083.

"There is a big gap today between the engineering guy that has designed the product and the guy that has to manufacture it. You really need the communications that will allow everybody involved in the design process to view the drawings. That way the guy in manufacturing can say, 'Hey, don't put that kind of bend in there — that's too hard to machine,'" Spivak explained. "The guy that takes care of inventory can say, 'Don't use that metal because we are out of stock.' This is also what I mean by the integrated approach."

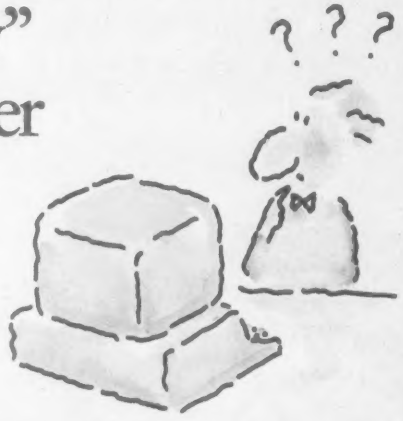
Spivak documented the company's increased commitment to the CAD/CAM market by pointing to the formation last year of a "several-hundred-person" group within IBM that is dedicated solely to producing CAD/CAM products. Further proof of the company's desire to make an impact in both the CAD and CAM markets, he said, is the number of software packages the company has released over the last two years.

Some of those CAD packages intended for mechanical design applications include Catia, which complements the company's Cadam package; Fastdraft; Cades; and CBDS, which is intended for CAD applications involving electronics.

"IBM has pledged $40 million worth of CAD/CAM systems to 20 universities. That is a pretty good indication of how serious they are about this market," Stanley Klein, president of Technology and Business Communications, Inc. and editor of the "S. Klein Newsletter," said.

Klein attributed IBM's CAD/CAM success in the past two years to users frustrated by the limitations of their turnkey systems. "Initially, turnkey systems were the way people got into CAD/CAM," he said.

Take "Know" for an Answer



Read *PC World*, The Most Indispensable New Magazine for Those Who Want to Know the Bottom Line About the IBM Personal Computer and IBM PC Compatibles

Are you now using or do you plan to use an IBM Personal Computer or an IBM-compatible personal computer?

Does it all seem very confusing to you?

If you don't know who to turn to for the most objective and impartial advice on the subject, you can easily get turned inside out. Or worse still, you can get turned off.

Now you can refer to *PC World*, the newest, liveliest, and most authoritative magazine, devoted exclusively to IBM and IBM-compatible personal computer users.

With its visually stunning format, colorful illustrations, and easy to read articles, *PC World* is designed to appeal to both technical and nontechnical readers.

Every month *PC World* will keep you posted on the most interesting, intriguing, and potentially useful applications for this remarkable machine.

It not only tells you about the best products on the market, but also how to use them.

In fact, *PC World* is one of the most inexpensive peripherals you can buy for your personal computer; it allows you to get the maximum use of your PC for a minimum investment.

Now for a limited time only you can become a Charter Subscriber to a magazine that's destined to reach the top of the personal computer charts. Enter your subscription today using the coupon and save up to 56% off the newsstand price.

Now *that's* the bottom line.

Yes, I'll take "know" for an answer. Please enter my subscription to *PC World* at a special introductory rate!

Name_____

Company_____

Address_____

City/State/Zip_____

U.S. & Canada only

☐ 12 issues $18.95 (47% savings)
☐ 24 issues $33.50 (53% savings)
☐ 36 issues $47.00 (56% savings)
☐ payment enclosed ☐ bill me later
☐ Visa ☐ MasterCard

expiration date_____

card #_____

Interbank # (MC only)_____

Toll-Free: 800/247-5470
from Iowa 800/532-1272

Please allow 6–8 weeks for delivery.

PC World
Subscription Dept.
P.O. Box 6700
Bergenfield, NJ 07621

M0162

The Premier Computer Graphics Conference

July 25-29
Detroit, Michigan

The Tenth Annual Conference on Computer Graphics and Interactive Techniques

SIGGRAPH '83 is sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the Engineering Society of Detroit, the IEEE Technical Committee on Computer Graphics and Eurographics.

Plan now to attend ACM/SIGGRAPH '83

SIGGRAPH '83 pulls together industry experts to present this year's most comprehensive computer graphics conference. There will be ample opportunity for graphics professionals to exchange ideas and discuss advanced techniques. There will also be programs to introduce the graphics novice to this expanding technology and its practical applications.

A complete technical conference, SIGGRAPH '83 offers:

- A wide range of courses on such diverse topics as introductory computer graphics, animation techniques, CAD/CAM/CAE and specialized graphics applications
- Technical sessions featuring the latest in research and innovative uses of computer graphics
- An equipment exhibition displaying a broad range of state-of-the-art computer graphics products
- Two evenings of computer-generated film & video shows
- A public showing of computer-generated art

The full spectrum of graphics

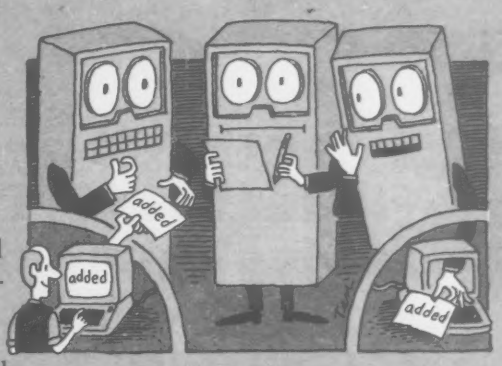
SIGGRAPH '83 attendance is mandatory for professionals striving to keep their computer graphics knowledge sharp. For registration information, contact the SIGGRAPH '83 Conference Office, 111 East Wacker Drive, Chicago, Illinois 60601 (312) 644-6610. Or, plan to register on site in Detroit on Sunday, July 24, between 1 p.m. and 11 p.m.

acm

Communication Concepts from the Bell System:

How to be certain that nothing is adddded to what you send.

Today, with the sheer volume of information being transmitted, the necessity of having to *retransmit* data that was garbled is not only inefficient and nonproductive, it can double the time it takes to receive accurate data. The engineers, scientists, and marketing executives of the Beli Network have developed communication concepts that allow you to be *certain* that what you send is what they get—the first time, 99.5% of the time.



Consider this scenario: You have an inquiry response system that provides information on demand. This data is virtually error-free. You select among a variety of transmission speeds. Retransmissions, practically nil. Downtime, minimal.

The concept is Data Management through Bell's Data Information Systems. And with DATAPHONE® Digital Service, you are able to transmit 56,000 bits of information each second, accurately and reliably. In fact, 99.5% accurate, 99.9% reliable. At any speed.

How? Digital transmission through the most powerful communication network in the world, the Bell Network. Digital eliminates the problems created by noise and distortion over distance. The flexibility and back-up system of the Bell Network monitors accuracy, notes trouble spots and takes corrective action. The Network can even tell you the location of the problem even if it's your own equipment. Your people have more time to do productive work because troubles and retransmissions have been reduced to a minimum.

As part of a distributed processing system where six or eight computers around the country share the load, they can efficiently communicate in their own language as if they were all in the same room. Without the chance of conversion error. While minimizing downtime, and virtually eliminating continued retransmission and customer network supervision.

To handle high volumes of data, Bell has both digital and analog High-Capacity Channels that can "bundle" your data, voice and image transmissions for better efficiency, performance and economy.

For analog transmission, Bell's Expanded 800 service allows you to predesignate the routes your data will take. Your unique network within the Network allows you to distribute dial-up traffic for maximum efficiency.

To find out how Bell can help you tailor a high-performance data system, large or small, that puts the Network to work for you, call **1 800 821-2121.**

Communication Concepts from the Bell System

Expanding your ability to communicate.

Opens Sales Offices in Major U.S. Cities

West Coast Software House Broadens Horizons

By Jeffry Beeler
CW West Coast Bureau

WESTLAKE VILLAGE, Calif. — One of the U.S.' oldest software suppliers has finally begun to make the fundamental transition from a regional to a nationwide organization.

During the first 26 years of its existence, Computer Data Corp. never once ventured outside the greater Los Angeles area in its efforts to promote the company's line of application software packages.

Now, however, the firm is beginning to lift the self-imposed restrictions on its marketing activities and is expanding the scope of its business to cover the entire continental U.S.

Overseeing the expansion is William Goodale, Computer Data's recently hired vice-president of sales and marketing. Although he joined the company only about two months ago, Goodale has already established regional sales and support offices in five major U.S. cities — Chicago, Houston, Kansas City, New York and San Francisco.

A sixth such branch office is expected to open in Atlanta by the end of May, according to Goodale, whose business plan calls for the firm's revenues to balloon from $2.2 million in 1982 to $30 million in 1986.

Computer Data's decision to enlarge the marketplace for its products geographically was prompted at least partly by the company's desire to satisfy the huge untapped demand for software among wholesale distributors — customers the firm has hitherto ignored.

"For a long time, we've been getting requests for software from wholesale distributors throughout the country, and we've finally decided to respond to those requests," Goodale said.

But to take advantage of the distribution industry's pent-up demand for application programs, Computer Data first needs to establish a nationwide presence. "The potential customers for our distribution software are going to have branch offices all over the country, and they need to know that our company will have sales and support people in places other than just the Los Angeles area," Goodale said.

Success in pursuing the distribution software business will also depend, of course, on having the right selection of packages — a need the company is trying to address with the introduction of an additional product line. Aimed at wholesale distributors and scheduled for first delivery in May and June, the line will consist initially of three packages — one each for inventory control, sales orders and purchasing.

By the end of June, the distribution product family will gain a fourth software module, a package for personnel, Goodale said.

Founded in 1956 as a service bureau, Computer Data dabbled in application software almost from the beginning. By the time the company celebrated its 20th anniversary, software accounted for an estimated 25% to 40% of Computer Data's total sales.

Then, in 1978, the firm broke the software side of its business into a separate division, which at the time supplied only a line of application packages for the standard accounting functions like general ledger.

Since then, Computer Data has announced its intention to enter the distribution software business while continuing to develop its existing product line. The company has also remained in the service bureau business and has further diversified by becoming an OEM for the Hewlett-Packard Co. HP 3000-series processors and the Digital Equipment Corp. VAX systems line.

On May 18th, *Computerworld* launches its first communications satellite . . .

COMPUTERWORLD
On Communications

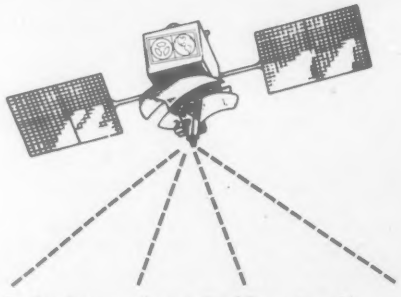
We are launching a new publication devoted to in-depth coverage of the broad spectrum of voice, image and data communications. *Computerworld On Communications* will examine communications issues, technology and applications from a systems perspective.

We recently did a study of *Computerworld* subscribers to determine their level of involvement and interest in communications. Of the 84% now using or planning to use communications equipment and services, 72% are personally involved in its selection and/or implementation. We found that these subscribers depend on *Computerworld* for communications information and prefer its coverage by more than 4 to 1 over the next publication in the field. This segment of our audience has a critical need for in-depth information on the constantly changing technology of communications.

As *Computerworld* expands its weekly news coverage of communications with interpretive information on products, equipment and services, *Computerworld On Communications* will complement that coverage with focused attention on the broader issues facing business communications users.

Computerworld On Communications will keep readers current on changing trends in the design, acquisition, operation, and optimization of corporate communications facilities. It will look at communications and networks from a systems perspective that relates technical capabilities with corporate goals.

In the two issues for 1983, *Computerworld On Communications* will apply the proven editorial resources of *Computerworld* to the area of communications networks. It will look at the implications of enhanced communications within the business organization together with the impact on established systems operations.



So, if you're among the majority of *Computerworld* subscribers who are personally involved in the selection and implementation of communications equipment and services for their organization, you'll find *Computerworld On Communications* a valuable addition to the *Computerworld* family of special publications.

As a Computerworld subscriber, you will automatically receive the two 1983 issues of *Computerworld On Communications* as part of your subscription. If you're not already subscribing to *Computerworld*, call *toll free* 800-343-5730.

Remember to look for *Computerworld On Communications* on May 18th and again on September 28th.

For advertising information on *Computerworld On Communications*, call Bill Dwyer, National Accounts Manager at (617) 879-0700 or your local *Computerworld* sales representative.

Premier Issue: May 18th

Boston/Chris Lee, Ed Mareckl, Joe Fitzhugh, Jim McClure, Kathy Doyle, Diane Sukey, *(617) 879-0700*
Chicago/Art Kossack, Newt Barrett, Jean F. Broderick, Chris Lee, *(312) 827-4433*
New York/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*
Atlanta/Jeffrey Melnick, Mike Masters, *(404) 394-0758*
San Francisco/Bill Healey, Barry Milione, A. G. Germano, Theodora Franson, Ruth Gordon, Eileen Dunn, *(415) 421-7330*
Los Angeles/Jim Richardson, Bob Hubbard, Beverly Raus, *(714) 556-6480*

IBM's Papes Named to Post In ISG Group

ARMONK, N.Y. — IBM today announced that IBM Vice-President Theodore C. Papes Jr. has been named assistant group executive, plans and programs, of the Information Systems Group (ISG).

Papes' responsibilities will include the finance and planning, management systems and business practices functions. ISG markets and maintains all IBM products in the U.S. and its territories and provides specialized systems to the federal government. ISG is headquartered in Rye Brook, N.Y.

Succeeding Papes as head of corporate management systems and organization staff at the company's headquarters in Armonk will be IBM Vice-President Thomas M. Liptak. He will be responsible for organization planning and planning systems.

Ronald F. Casella, IBM vice-president, has succeeded Liptak as president of the Customer Service Division. The division, a part of ISG, provides maintenance, support and programming services within the U.S. for small information processing systems, related peripherals and office and communications products.

ONE GENERAL LEDGER IS THE INDUSTRY STANDARD

GENERAL ELECTRIC

4,000 USERS AGREE

SOFTWARE INTERNATIONAL's® General Ledger and Financial Reporting System is hard at work at more than 4,000 sites worldwide—in some of the world's largest, most diverse, and best-managed corporations. That's more than any other competitive product. Firms like E.I. DuPont, R.J. Reynolds, Miller Brewing Company and hundreds of other Fortune 500 companies have selected our General Ledger over the competition. That's why it's the *industry standard*, a state-of-the-art product continually improved to stay at the leading edge of software technology and give you more "accountability" than any other financial software package.

No other General Ledger provides as much easy-to-use reporting power and on-line access to information. On-line review of account activity and balances gives you better control of budgets, minimizes the need for paper reports, and frees your accountants for more financial analysis. Labor saving on-line standard journal entries are convenient to use, reduce posting errors, and facilitate fast, easy checking. A powerful interactive editing capability helps you identify and correct errors before information is updated. Our General Ledger gives users immediate access to current, accurate information by simultaneously updating both posting and summary level accounts throughout the system.

The system is installed quickly. Many users report that they are closing their books faster, producing reports in hours instead of days, and generating more relevant information for better business decisions.

Because no business operates solely from a General Ledger, our system interfaces with our top-quality Accounts Payable, Accounts Receivable, Fixed Asset and Payroll/Personnel packages to form a comprehensive and powerful financial information system.

Software International has been installing and supporting high-quality, problem-solving financial application packages for almost two decades. That's why THE SOFTWARE gives you something extra: *confidence.* Confidence in complete, thorough training and documentation. Confidence in our commitment to product enhancement and stringent quality control. And confidence in our customer support. As a subsidiary of General Electric Information Services Company, we are part of a worldwide family of more than 5,000 computer and business professionals.

Find out why our General Ledger is the one you should measure the others against. Ask a user. Or call us for more information. You'll easily see why THE SOFTWARE is the industry standard you can account on.

CONFIDENCE IN EVERY PACKAGE

SOFTWARE INTERNATIONAL®

A Wholly-Owned Subsidiary Of General Electric Information Services Company

One Tech Drive, Andover, MA 01810 (617) 685-1400

CALL TOLL-FREE 1-800-343-4133

(IN MASSACHUSETTS 1-800-322-0491)

Atlanta (404) 955-3705 Boston (617) 685-1400 Chicago (312) 773-8008 Columbus, OH (614) 773-2167 Dallas (214) 960-0220 Denver (303) 388-9593 Houston (713) 444-3348
Kansas City, MO (816) 471-4664 Los Angeles (213) 573-0403 New York (914) 253-8050 San Mateo (415) 574-5800 St. Louis (314) 342-7860 Wilmington, DE (302) 478-8980
Montreal (514) 845-6124 Toronto (416) 924-1461 Vancouver (604) 669-6122

Australia, Colombia, France, Guam, Hong Kong, Israel, Italy, Malaysia, Mexico, New Zealand, Saudi Arabia, Scandinavia, Singapore, South Africa, Spain, Switzerland, The Netherlands, United Kingdom, West Germany

Harris Restructures Government Systems Sector

MELBOURNE, Fla. — Harris Corp. has announced the restructuring of its Government Systems Sector in a move that creates a new group, six divisions and two operations. It previously consisted of four divisions.

Harris said the changes were made to accommodate anticipated growth while reflecting a "philosophy of highly decentralized operations." The sector's 1982 sales were pegged at $400 million, up 30% from the previous year, with similar increases expected by the firm in '83.

Phil Cobb, former vice-president and general manager of one of the sector divisions, will serve as vice-president and group executive of the new sector. Reporting to him will be Richard Farotto, vice-president of the Satellite Communications Division; Allan Beaupre, vice-president of the Data Communications Division; and Lawrence Cassel, vice-president of the Satellite Terminals Division.

Charles Herbert will head the Aerospace Systems Division, Phillip Henderson the Information Systems Division, Arthur Vernon the Electronic Systems Division, Julian Scott the Special Programs operation and Phillip Farmer the Support Systems Division. Richard Hartig has been promoted to vice-president of business development of Support Systems.

Productivity Improvement Cited

Robots' Flexibility Seen Key Factor

WELLESLEY, Mass. — While productivity improvement is the prime impetus behind the increasing use of industrial robots, there are a number of individual factors that generate the desired improvements in productivity. According to a new user survey conducted by Venture Development Corp., the flexibility resulting from the use of industrial robots is their most attractive attribute.

"The Industrial Robot Industry: A Strategic Analysis" claims the combined U.S. production and import of industrial robots will expand from the $192 million level in 1982 to $828 million in 1987. The average growth rate over that period will be 34% per year.

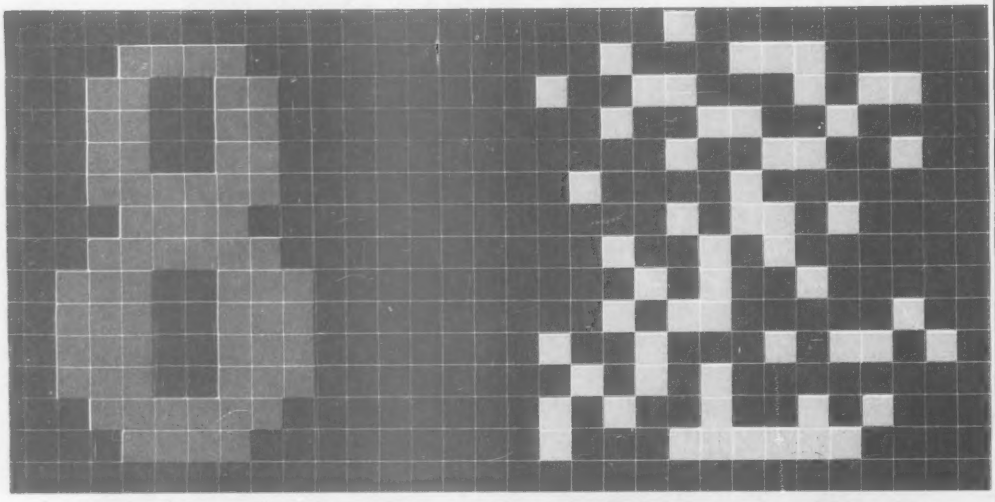
As users see it, the manufacturing flexibility offered by robots will reduce the economies of scale required for the automation of a manufacturing process. Instead of being dedicated to the manufacture of a single high-volume product, flexible manufacturing systems provide the capability to manufacture many different product families on the same machinery.

Furthermore, the study notes, flexible robot systems enable a rapid switch from one product to another without major penalties for setup and changeover costs.

Reduction in the economies of scale will attract more competitors and will also increase the ability of manufacturing industries to respond quickly to changes in market needs. At the same time, the competitive environment will become more intense.

More intelligent robots employing sophisticated large-scale integration/very large-scale integration, software and sensor technologies will correspondingly increase their flexibility. This enhanced flexibility will further differentiate robots from conventional "hard automation."

According to users, the second most attractive benefit afforded by robots is the reduction in dependence on labor, not only in tedious or hazardous jobs, but also in those requiring skilled operators. Increases in plant capacity, as well as quality improvements, were reported to be the third and fourth most important attributes of industrial robots, according to surveyed users.



T-BAR AHEAD!

New In Look . . . New with advanced operational features . . . new cost effective expansion flexibility . . . new with what hundreds of users have asked for.

Now for IBM 2914, 3814 and other present and future computer switch users, T-Bar's ready with a CRT controlled superstar computer switch — the new 3690 which scores ahead of its nearest competitor at least eight significant ways:

1. **Incremental Upgrades:** By single channel or single port.
2. **Versatile Control:** Programmable CRT Microcontrol with manual back-up.
3. **Most sizes:** 379 matrix sizes from 2x2 to 16x24.
4. **Investment Protection:** Wrap-around upgrade of existing T-Bar computer switches.
5. **Advanced Design:** Technology already compatible with state-of-the-art bidirectional applications.
6. **Expanded Diagnostic:** Activity Indication All Channels. Latchable LED diagnostic indication with access for recording and analysis.
7. **Operator Protected Switching:** Eliminates inadvertent data interruption.
8. **Low Price:** As much as 20% less than comparable units.

T-Bar's 3690 continues a tradition began in 1975 when T-Bar first engineered dependability, reliability and compatibility into a computer switch. Those first early models — still on-line and compatible with every IBM upgrade since — set a standard of excellence that is the distinguishing characteristic of every T-Bar product.

Today, as central host sites multiply, system capabilities expand, interfaces and peripherals increase, T-Bar's 3690 is ready to facilitate a variety of tasks: simplified service restoral, rotate peripherals, increase up-time, reduce capital costs, control and monitor countless connections and many other functions. If your data processing system is ready for a matrix switch, you're ready for a 3690. Call or write T-Bar Incorporated, 141 Danbury Road, P.O. Box T, Wilton, CT 06897 (203) 834-8368.

T-Bar's 3690
Computer Matrix Switch

T-bar®
SWITCHING TECHNOLOGY
FOR CRITICAL APPLICATIONS

See us at Booth W6370

deCastro Tells Symposium Attendees

Shakeout Seen for One-Product Micro Vendors

By Bill Laberis
CW Staff

FRAMINGHAM, Mass. — The future of business microcomputing belongs to vendors offering upward migration to larger systems, not to the plethora of single-product companies that may well find themselves "shaken out" of the market in a few years.

So said Edson deCastro, president and founder of Data General Corp., at a recent symposium here titled "The Small Systems Economy: Crisis and Opportunity," sponsored by the Interface Group.

However, the "old guard" in the computer industry — those companies a decade old or more — have to develop more of an end-user orientation and offer better applications software or run the risk of being shut out of the burgeoning microcomputer market. This observation was made by Peter Lowber, senior market analyst with the Boston-based Yankee Group, who also spoke at the symposium.

DG's deCastro said his company is poised for success in the micro arena because of its ability to offer users both a present and future personal computer solution. DP departments, he said, are taking a closer look at computing expenditures, directing micro purchases to those products that can be most easily upgraded to accommodate growth. DG is slated to announce its first entrant in the personal computer arena "sometime soon," deCastro said.

"It is not always the first in the market that is the most successful," deCastro said, commenting on the "traditional" computer companies like DG that have either recently announced personal computer offerings or have yet to do so. "There is still room enough for new vendors to enter the market, and those who enter may take advantage of the lessons learned over the past five years. We are in a first-time buyers' market now, but in a few years we will be part of a replacement market, which may be difficult for single-product vendors," he said.

For companies such as DG that grew up in the minicomputer and mainframe era, the micro surge of the '80s presents some unique challenges, deCastro continued. "For many computer vendors who remember the days when they built a hotbox and pushed it out the door to OEMs, this is a far different market," he remarked.

One of the more formidable of these challenges is the means of distribution of micro products, he said. Asked if DG would market its yet-to-be-announced personal computer through retail outlets, deCastro hedged, saying the retail "channel is pretty full right now."

Lowber said that while the traditional minicomputer and mainframe vendors bring tremendous financial clout and technical expertise to the micro market, they also bring inherent handicaps that they must overcome to be viable micro vendors.

CW Photo by B. Laberis
Edson deCastro

For one thing, Lowber said the mini makers that have announced personal computers have been slow to seek applications software development from third-party software houses. It was IBM's decision to utilize the third-party vendors that enabled the company to score a "market miracle ... overwhelming the market" with an overrated piece of hardware, Lowber said.

But most important, according to Lowber, is that the mini makers are not end-user-oriented to the extent they need to be to capture the masses of first-time users seeking personal computers.

Study Sees Communications Impacting Future Micro Sales

LOS GATOS, Calif. — Data communications will become one of the leading factors affecting microcomputer sales growth and use in this decade.

That is one of the findings of a study just released here by Enlon Associates that focuses on the microcomputer arena.

"Microcomputer Data Communications, 1983" describes the U.S. potential for data communications in light of microcomputer growth, forecasting sales of 28 million microcomputer systems valued at $20 billion by 1990. The study also forecasts a total installed base of 100 million units by that time.

The study predicts rapidly increasing workstation acquisition, with sales rising to more than four million units by 1990, at which time 625,000 local-area networks with over five million nodes will be in place. In addition, revenues of local-area network vendors will increase 96% per year to an annual total of $2 billion by 1990, the report noted.

The report also details the technology and market trends for remote data communications, discussing two-way communications, bulletin boards, information utilities, data bases, electronic mail and banking and shopping — all of which the study predicts extensive use of by 1990.

The study is priced at $1,600 from Enlon Associates, headquartered at 119 Belvue Drive, Los Gatos, Calif. 95030.

Westwood is a T.I. Supermarket

WESTWOOD, the East Coast's computer professionals since 1964, is a leading authorized dealer for Texas Instruments. We stock T.I.'s Silent 700 and Omni 800 Electronic Data Terminals and the T.I. Professional Computer. Call us today for your data terminal and microcomputer needs. We offer immediate delivery, unsurpassed reliability, customer support and a highly experienced service department.

THIS MONTH'S SPECIAL
MODEL: Refurbished 745
SALE PRICE: $745.

Westwood
DATA COMMUNICATIONS EQUIPMENT
25 Route 22 E, P.O. Box 518, Springfield, N.J. 07081
Corporate HQ, NJ (201) 376-4242 • NYC (212) 662-0060 • Conn. (203) 932-6383 • Phila. (215) 972-0283 • Pittsburgh (412) 881-2590 • Boston (617) 451-6550 • Baltimore (301) 358-7820 • Cleveland (216) 476-9336 • Wash., D.C. (202) 737-0244 Camden (609) 829-7280

We Deliver!
SALES – LEASES – SERVICE

HOW AN INNOCENT COMPUTER SALES PITCH CAN LAND YOU IN COURT.

New business laws are becoming stricter and much more specific. So if your salespeople don't know where "puffing" ends and misrepresentation begins, you'd better teach them ... quick. Ignorance of the law is no defense, and misinformation could cost you real money in court. In response to this need for legal understanding, Roundtable has produced a new training film that can save you from lawsuits for misrepresentation, breach of warranty, and antitrust violations. It's called *The Legal Side of Selling*, it's in color, it's written by an attorney and in just 25 minutes it focuses on the legal knowledge your salespeople need.

Just fill out the coupon and attach your business card, or call (800) 332-4444 so we can arrange for you to preview the film.

I'm interested in your new training film "The Legal Side of Selling."
☐ 2-Day preview @ $30 (16mm only)
☐ Please send me your FREE CATALOG of over 70 films and video cassette programs
☐ FREE PREVIEW at our Beverly Hills Screening Room

Ship and Bill to:
NAME _____ TITLE _____
ORGANIZATION _____
STREET ADDRESS _____ CITY _____ STATE _____ ZIP _____
PHONE _____ PO # _____
AUTHORIZED SIGNATURE _____

ROUNDTABLE FILMS
113 N. San Vicente Blvd., Beverly Hills, CA 90211. (213) 657-1402

Engineers Need CAE Tools to Excel, Exec Says

By Robert Batt
CW West Coast Bureau

SAN DIEGO — Engineers in the computer and electronics field will not be able to function effectively without direct and individual access to computers dedicated to their specific needs.

This was the main theme of a speech by Alan Dawes, director of marketing, engineering information systems, at Versatec, Inc., a subsidiary of Xerox Corp., at the Fifth Annual Conference on Computer Graphics '83, sponsored by Frost & Sullivan, Inc. here recently.

Dawes outlined two industry trends confronting engineers and forcing them toward the use of computer-aided engineering (CAE) tools:

CW at Computer Graphics '83

- A drastic shrinkage of time between original project concept and full implementation, covering phases such as project funding and design implementation, production engineering and manufacturing, marketing and distribution.
- A simultaneous, severe new set of pressures revolving around the cost and complexity of new products, including increased marketplace competition and the urgent need for higher productivity on the part of everyone in the product development process, at every level in the organization.

Computer engineers, Dawes asserted, must get more and better results for every hour of their work. They must integrate quality and reliability into the entire development process, while remaining technically competitive. The use of intelligent workstations will reduce design and rework time, get the product to market more quickly and result in better and more powerful end products.

But so-called user-friendly tools are not sufficient, he warned. "We must make our technological solutions user-transparent. In other words, we want to do our work, not have to think about our tools. They must become natural, second nature, intrinsic to our minds and eyes, our hands and our working goals."

The provision of individual workstations is also not enough, Dawes added. Because of the teamwork nature of most engineering jobs, engineers require a network of similar workstations with which they can interact. There is a need to establish local, regional, national and even international networks without degrading individual workstations' performance.

The goals of such a system, he said, are to create, process, edit, file, print and distribute engineering information electronically, at much lower cost and in much less time than has been available. Actual workstation cost and system cost, he asserted, will depend on user configuration, how many peripheral services support how many workstations, how large the files and networks are, how many engineers are being served and how extensive the system turns out to be.

Japan's Graphics Seen on the Rise

(Continued from Page 139)

Machover said, "To date, the computer graphics hardware and systems market has been dominated by U.S. manufacturers, and the Japanese have not been major contenders.

"Over the next few years, however, I expect to see much more aggressive hardware product entries from the Japanese." he said.

Machover noted that one Japanese manufacturer, Seiko Ltd., has announced a high-resolution monitor and digitizer, while Hitachi Ltd. is also showing signs of becoming an aggressive supplier of graphics systems.

Turning to the question of software in the graphics industry, Machover predicted the emergence of much more specialized software oriented toward specific applications. "We are beginning to see more and more product introductions that make it relatively easy for the non-graphics- or computer-skilled user to use these systems as problem solvers," he asserted.

In the CAD/CAM area, he claimed, the major thrust is in solid modeling with systems that use combinational geometry capable of displaying extremely complex images. "The expectation is that these systems will be continually improved to allow for interactive modeling and that traditional line drawings will simply be a by-product of the solid modeling procedures."

So far, the presentation of realistic images has either suggested extremely long computation times or extremely expensive hardware. Over the next decade, he said, the cost of hardware for real-time representation of realistic images should be reduced.

By the middle of the decade, he predicted, it should be possible to buy such systems for between $100,000 and $200,000, according to Machover.

In an increasingly competitive computer marketplace, even the highest quality systems can use a selling edge. An added value that can separate one line of equipment from another. That can help sell more products. And help increase profits.

TRW. Because professional service can make the difference.

That big difference is TRW Customer Service.

Because of quality. TRW evaluates each product to ensure that it meets the highest quality standards of the industry.

Because of responsiveness. TRW maintains a network of almost 3000 highly trained professionals in over 200 U.S. locations (including Puerto Rico & Hawaii) to provide immediate service whenever and wherever customers need help.

Because of experience. TRW has an unmatched record of servicing over 700 different products — from large computers to most plug compatible peripheral equipment — for more than 80,000 customers at more than 250,000 sites.

The Competitive Edge In The Computer Age.
Join the many successful organizations who have already increased their sales with the special power of TRW Customer Service Division — the largest independent maintenance organization in the nation. One service contract. Single service source. One service call. And no excuses.

TRW

TRW Customer Service

For information, write:
Customer Service Division of TRW Inc. 15 Law Drive Fairfield, NJ 07006 (201) 575-7110

© TRW Inc. 1983

Audience Warned Of 'Graphics Anarchy'

CW at Computer Graphics '83

By Robert Batt
CW West Coast Bureau

SAN DIEGO — A strong warning about the growth of "graphics anarchy" was issued to participants attending the Fifth Annual Conference on Computer Graphics '83 held here recently.

In a speech titled "The Application of Computer Graphics to the Decision Support Process at Senior Management Levels," Robert Widener, president of Intelligent Interlink Corp., cla[illegible] the graphics industry is lackir.g in basic business disciplines.

"The graphics market has been seen by many people as a new toy and has been driven by technology rather than by business methodologies or disciplines. This will lead to graphics anarchy unless some standards are put in place," he asserted.

Widener emphasized the emergence of graphics standards as the key to the credibility of graphics as a business tool and its acceptance by senior management. "We have defined algorithms that cater to management decision making and yet we haven't come up with applications that reflect management's point of view," he stated.

Most graphics charts, he pointed out, do not have a common frame of reference that leads to their being distrusted as a management tool by top executives, particularly in the current dynamic economic environment. "If we don't have a set of disciplines and ground rules by which our charts are made, we are going to invite chaos," he added.

Also speaking at the conference, which was sponsored by Frost & Sullivan, Inc., was Peter Preuss, president of Integrated Software Systems Corp. Preuss stressed the need for more user-friendly systems.

"In the graphics industry, we have set our expectations of the user too high. Training is no longer an acceptable concept in business graphics. The need is to make devices easier to use," he told his audience.

The ability to make systems more flexible is vital to the growth of the industry, he said. Very often the user's attitude is, "If I can't get it the way I want it, I don't want it at all."

He also warned of the need to increase quality which, he stressed, is now being demanded by large corporate users and cannot be regarded as a luxury.

Nevertheless, Preuss claimed, the graphics industry will continue to experience rapid growth, which is due, in large part, to the rapid increase in computers per user site. "The functional growth of business graphics as a management tool is increasing exponentially with the growth in organizations," he said.

He pointed to the fact that 67 new graphics devices were introduced into the market last year and noted that some large corporations, such as 3M Corp. and Schlumberger Ltd., are now substantial users of graphics.

Preuss claimed the connection between data and graphics will allow for a much expanded use of computer graphics, particularly in the area of manufacturing. "To access data, the user cannot be restricted to the data base because a lot of data will not be stored there. In gaining access to data, software will be an integral part of the graphics market, and a graphical report generator will be a tool that users will require on a continuing basis," he added.

SOLVE YOUR NETWORK COMPATIBILITY PROBLEMS

The MC-80 is a versatile Micro-Processor Based Controller providing conversion between dissimilar data communications protocols. A low cost solution, the MC-80 allows a network to grow or change without making existing devices obsolete. Starting at **$1,295**

- IBM 2780/3780 BSC to Async ASCII Devices
- Burroughs Poll/Select TDI/EIA to Async ASCII
- IBM 3270 BSC to Burroughs Poll/Select
- IBM 3270 BSC to Async ASCII Devices
- IBM 3270 BSC to NCR Poll/Select
- Special Applications
- SNA available 1983

NEW: Full 327X Emulation supporting 1 or 2 Async CRT/Printers

Innovative™ network data communications

See us at NCC in Anaheim May 16-19, 1983

(305) 624-1644
1-800-327-3955

INNOVATIVE ELECTRONICS, INC. 4714 N.W. 165th St., Miami, FL 33014

Built-In Beats Bolted-On

Braegen's Way Puts True 16-Bit Personal Computing Inside A Low-Cost, 3274-Compatible Cluster Controller.

Several companies now offer personal computing capability as part of their 3270 terminal package. Their approach, however, has built-in problems—primarily because the personal computing *isn't* built-in, but just bolted on.

Braegen's way works better. Because our new 8410 Cluster Controller features integral personal computing, the user gets maximum processing versatility and performance while the DP Manager gets maximum control and cost savings.

More Versatility And Power. You can attach up to eight ergonomic display stations to the 8410—and with one keystroke turn them all into true 16-bit PCs. You can access a wide range of applications software operating under MP/M-86. And you can upgrade from 128 to 640 Kb of RAM—or integrate a 10-Mb Winchester drive for optimum multi-user response and security.

More Control And Economy. Undoubtedly, it is the control you gain and the dollars you save that really distinguish the 8410. Because the PC capability is integrated into the controller, each user is tied into the overall corporate communications network—giving the DP Manager control over critical computer resources.

Just as important is the considerable cost control achieved. First, the 8410 *starts* as a more cost-effective alternative, even operating only as a 3274 remote cluster controller. But by adding multi-user PC capability, the 8410 can save you thousands of dollars—and a lot of space—in equipment alone. There's no investment in additional software for each workstation, or in additional communications lines. Expensive resources—such as letter-quality printers and Winchester drives—can be shared. And a unique remote-maintenance feature that lets our Field Engineers dial up and diagnose the 8410 from any location reduces down-time costs.

For ten years now, Braegen's way has worked for an impressive base of customers. The 8410 with integral personal computing; its low-cost counterpart, the 8400 Remote Cluster Controller with up to 16 attachments; as well as our nationwide sales and service network are just three persuasive reasons why.

Put Braegen's way to work for you. Call or write The Braegen Corporation, 20740 Valley Green Drive, Cupertino, CA 95014 (408) 725-1252; TWX: 910-338 7332.

BRÆGEN

Higher Performance Graphics Systems Seen

CW at Computer Graphics '83

By Robert Batt
CW West Coast Bureau

SAN DIEGO — Technological developments will lead to the introduction of much higher performance graphics systems within five years with raster displays in particular having a competitive advantage.

This prediction was made by John McPherson, president of Vector General, Inc., a graphics manufacturer, in a speech at the Fifth Annual Conference on Computer Graphics '83, sponsored by Frost & Sullivan, Inc.

McPherson said the use of very large-scale integrated (VLSI) circuits, the constantly falling cost of memory and higher volumes in terminals means that performance is increasing at a time of corresponding price reductions.

"As a result, we will have a high-performance graphics system by 1985. Raster displays with a resolution of 2,000 by 2,000 pixels will be produced economically, and a display that has a resolution of [2,000 by 2,000 pixels] will meet just about all the resolution requirements of almost any user," he claimed.

Because of these developments, raster displays will experience substantial cost reductions, but the cost decline of vector displays will have run its course, he asserted. "The raster will benefit from the continued decline of semiconductor prices as new, more dense VLSI and memory devices are developed. As a result, by 1987, I think we will see high-performance, full-color raster display systems selling at about $10,000 per workstation," he added.

McPherson said that with a growth rate of 30% a year, the market for graphics display will reach $10.6 billion by 1987, compared with $3.7 billion today. This market will include display systems, controllers, processors including mainframes and the software necessary for the system to serve its intended use.

"Very few systems will ever truly be stand-alone. Most applications require a hierarchy of processing, allocating tasks on the basis of need and economics. Communications is a very important part of the display system today and will increase over the coming years," he asserted.

With today's state of the art, McPherson said, there are significant differences that dictate the choice of display system. Different applications, he suggested, will dictate the use of different display systems. If high resolution is required, users will choose vector displays, he maintained, because of the greater number of elements available and because of their ability to communicate quickly via the CRT face using light pens or data tablets.

When it comes to simulation techniques, however, raster technology is more applicable because the function requires area fill (the ability to display a shading within the outline of an object), which can only be performed by raster, he claimed.

McPherson predicted that raster will command around two-thirds of the overall computer graphics market by 1987 because of technological developments, with raster color display systems costing between $10,000 and $25,000, compared with $60,000 in 1981.

New Companies

Forte Data Systems, Inc. will manufacture interface products that permit direct communications between personal computers and mainframes via coaxial cable connections. It is located at 1500 Norman Ave., Santa Clara, Calif. 95050.

C. Itoh Electronics, Inc. and its marketing firm, Acro Corp., have formed a new subsidiary, **CIE Terminals, Inc.** The new company, located in Irvine, Calif., will market C. Itoh Electronics' terminal product line and 300/600 line/min dot matrix line printers.

Intelligent Technologies International, a new company specializing in integrated microcomputer hardware and software, has named Verlaine Crawford vice-president of marketing and Edward Brennan vice-president of operations and finance. The firm is located at Suite 302, 151 University Ave., Palo Alto, Calif. 94301.

Advantage Systems, Inc., 395 Totten Pond Road, Waltham, Mass., is a new company offering integrated hardware and software systems for banks on a turnkey basis.

Dr. Robert B. McCullough, a founder and past vice-president of operations of Magnuson Computer Systems, Inc., has started **Sunol Systems,** a firm that will design and manufacture peripheral products. The company can be reached through P.O. Box 1777, 1072 Serpentine Lane, Pleasanton, Calif. 94566.

Raytheon introduces an processor designed

We were there at the birth of modern word processing. So it should come as no surprise that when we designed the Raytheon information processor, we didn't forget that human beings come with backs, arms, fingers, necks, eyes and other assorted parts. And use them in different ways to do different jobs.

That's why we designed our RDS-200 Series of information processors to adapt to human anatomy, instead of asking people who operate our system to adapt to us.

The result is an ergonomic information processor that is one of the most comfortable and easiest to use.

And without a doubt, a most productive addition to the office.

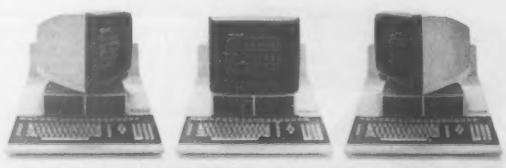
Besides being human engineered, it's also versatile. For example, it can converse with a variety of other word processors, host computers, and mini and personal computers. And with readily available CP/M® software, it can perform just about any office data processing job.

Planning for shared resources, clustered word processing and, finally, a fully integrated office system? Look to Raytheon, the company with more than a dozen years of experience in designing products that increase office productivity.

For more about our extraordinary information processor, the RDS-200, call 800-343-6676; in Massachusetts: 617-762-6700, ext. 3137. Or use the coupon.

We sculpted keys to conform to the contours of your fingers. A small point perhaps, but after hours at the keyboard, you'll feel more relaxed.

Ergonomics Raytheon-style extends all the way to our hydraulic chair. Just the flick of a lever, and it adjusts to support your back and reduce strain and fatigue.



Our display tilts and swivels, so your neck doesn't have to. A little extra comfort can mean a lot of extra productivity.

Mixed Reports Filed on Comdex Show Layout

By Katy Gurley
Special to CW‡

ATLANTA — The first Comdex show to have exhibits in two separate halls is being hailed as a success by its promoters, but has been widely criticized by exhibitors who said one of the halls was poorly attended.

A petition requesting a partial refund from The Interface Group, Inc., the show's promoters, was circulated among exhibitors at the Atlanta Apparel Mart during the last three days of the show, Comdex Spring '83.

The petition asked for an unspecified reduction in Comdex Spring '83 booth rates with the difference to be applied to future booth space. It also requested that special consideration be given to Apparel Mart exhibitors in choosing future booth space. The petition of about 15 names was presented to Interface President Sheldon Adelson the day before the show closed. There were between 160 and 170 exhibitors in the Apparel Mart, an Interface official said.

Of a dozen exhibitors interviewed at random by *ISO World* at the Apparel Mart on the third day of the show, 10 said they were disappointed by low attendance. A few said they had signed the petition; others said they had not seen it. About 550 exhibits were held in the nearby World Congress Center, where all other convention activities were held and attendance was reportedly higher.

Complaints by Apparel Mart exhibitors included limited parking near the Mart, slow bus shuttle service and the lack of seminars or other crowd-drawing activities, according to Len Wilker, president of Teletex Communication Corp. of Foster City, Calif., and a spokesman for the loosely formed group of Apparel Mart protesters. All seminars and the conference keynote speech were in the World Congress Center.

Richard Katzeff, vice-president of operations for Interface, said no official response has been made to the petition-signers, but that it was doubtful that any refunds would be offered.

"I doubt very much if we would do a thing like that. It would establish a terrible precedent," he said. "From everything we heard, overall, people were very well satisfied." Traffic at the Apparel Mart was slow on April 25, the show's first day, but during the rest of the week the aisles "were so crowded you couldn't walk through," he said.

Exhibitors are assigned space at

(Continued on Page 158)

Dealer Success In Micro Mart Hinges on User

By Susan Carlson
Special to CW‡

ATLANTA — The focus in the personal computer industry today is shifting "away from the system and toward the individual," Philip D. Estridge, IBM vice-president, told dealers here at the recent Comdex Spring '83.

Estridge advised dealers that their own success will depend on whether they "go the extra mile to support the customer.

"In many ways, the strength of our industry appears to be its technology, the quality of products, their reliability. All of those things seem very dazzling right now," Estridge said.

"But the key to success in the personal computer industry is not technology. It's our persistent focus on servicing the customer. Technology will fade and change. The thing that endures is service."

Estridge's remarks were part of the keynote address he delivered opening the Comdex show on April 24. Hundreds of dealers and exhibitors gathered in the auditorium of the Georgia World Congress Center to hear Estridge before attending the four-day show.

"The personal computer industry," Estridge said, "is going through an important shift, a shift that many industries are unable to complete. It's a hard shift to make, and it comes at a time when it doesn't seem necessary — when sales are peaking." But from amid the expanding multitude of new products and new computer dealers, the critical element, he said, will be service. "That is a requirement. All else will fail if that fails."

Throughout his remarks, Estridge noted that changes in the industry have created "stress in the distribution channel." Those changes include not only the demand for customer service, but also the dizzying proliferation of products and the lack of user sophistication.

Estridge also acknowledged the stress exerted on dealers from product shortages and from competition from IBM's direct sales force. In recent weeks, dealers have expressed mounting concern over those issues.

"I wish we had a large enough supply to fill all orders," he said. "And I wish there was no competition with our direct sales force, but there is."

Estridge advised his audience to focus less on the competition and more on the customer.

"Keep an eye on the customer, not the competition," he said. "The competition won't buy your products — at least they haven't bought ours."

extraordinary information for every body.

The characters on our nonglare screen are larger than most. And our high-resolution green-on-black screen is easy on your eyes. For convenience, there's a special full-page mode that lets you see exactly how your work will look on the finished page.

With Raytheon, ergonomics is also a way of doing business where people come first. Instead of asking you to send your people to us for training, we send our trainers to your office. And with Raytheon, you have the service backup of more than 1,000 people in 174 offices worldwide.

Most computer companies ask you to memorize multiple keystroke command codes. Raytheon gives you one-stroke command keys—each labeled in plain English.

CP/M IS A REGISTERED TRADEMARK OF DIGITAL RESEARCH CORP

Mail this coupon today

Raytheon Data Systems
1415 Boston-Providence Turnpike
Norwood, MA 02062

☐ Please send me all the facts on the new Raytheon RDS-200 Series of information processors.
☐ Please have a sales representative call me.

NAME TITLE
FIRM TEL#
ADDRESS
CITY STATE ZIP

RAYTHEON

We design computers around people.

Printer Manufacturers Moving Into Retail Mart

By Katy Gurley
Special to CW‡

ATLANTA — Printer manufacturers who have traditionally sold through OEM channels are polishing up their products, putting their own labels on them and moving them through the retail market.

Two such firms — Alphacom, Inc. and Anadex, Inc. — have recently established new marketing strategies to sell products through traditional retail channels, according to spokesmen for the firms.

This is being done in addition to their OEM programs.

The reason for the move, they said, is the explosive growth of the microcomputer industry in general. The demand for printers parallels the growth of personal computers, enabling a manufacturer nowadays to make more money by selling printers both to the retail and OEM markets, the spokesmen said.

Escalating Trend

Veteran peripherals distributor Jay Freeman of F.A. Components in Carona, N.Y., said this trend has been growing over the last two years.

"You can see it in the way contracts are given to distributors. It used to be that the contracts were pretty much based on high quantities with no two-tier setup," he said, noting that those contracts have been changing.

"Many manufacturers are starting to wake up to the fact that there's a market out there they've been missing," he said.

Several modem, disk drive and printer manufacturers have recently begun offering two-tiered programs to distributors, he said.

Anadex, which has built its OEM reputation on its high-volume workhorse serial dot matrix impact printers, entered the retail market with its full product line in December, said Richard L. Weaver, marketing communications administrator.

'Over the past couple of years, we began to notice that the retail market has really opened up," he said.

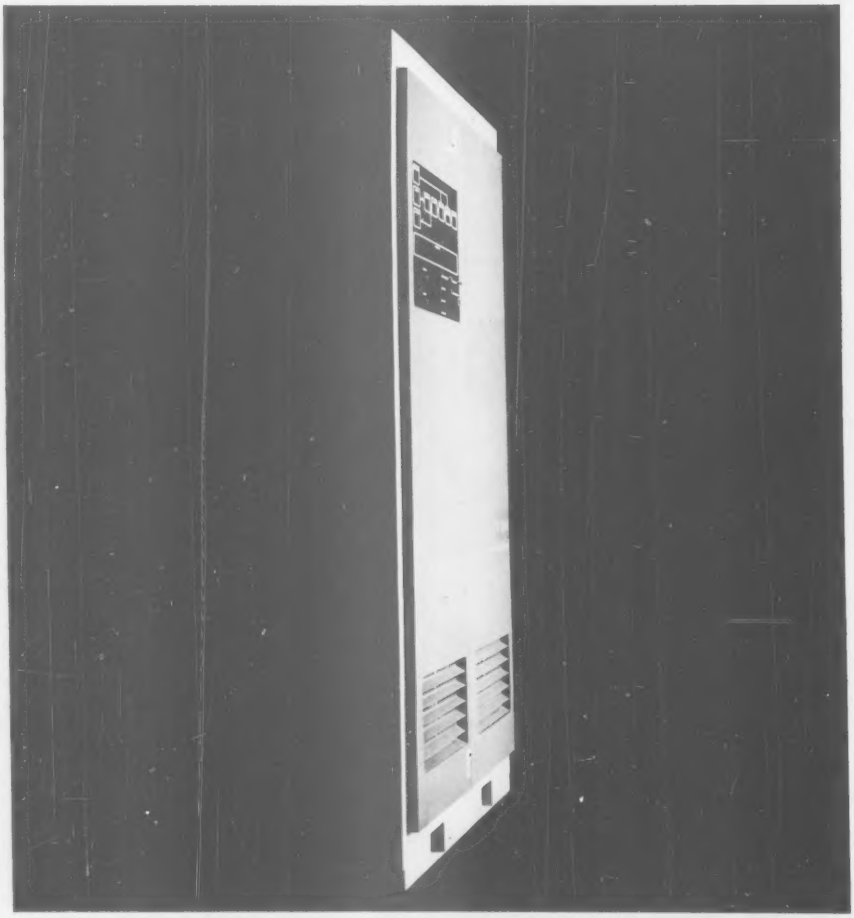
The Chatsworth, Calif.-based firm was cautious at first and decided to make a push for the retail market only after some serious in-house soul searching last fall, he said.

The firm is now confident that the retail market is a big money maker and has established a full dealer support and incentives program, he said.

According to Weaver, the OEM avenue, however, is still the firm's

(Continued on Page 160)

WITH A GOULD UPS, YOUR LAST RESORT WON'T BE THE FIRST THING TO BREAK DOWN.



When your power fails, you need an UPS (uninterruptible power system) that won't. Because blackouts do more than leave you in the dark. They leave your computer without a memory.

Gould technology brings you an UPS that keeps your computer running smoothly throughout blackouts, brownouts, spikes, surges. In short, any disturbance on your power line.

Our UPS will always keep you in power because we keep our design simple. We use the minimum number of conservatively rated parts. That means fewer parts to break down. And fewer parts to keep up.

The result of this simple logic is an MTBF that exceeds 100,000 hours. And Gould uninterruptible power systems are available in ratings from 500VA to 45KVA.

See us at NCC, Booth No. 6058.

So if you need an UPS you can count on under any conditions, put Gould to work. And discover the power of simplicity.

Gould Inc., Power Conversion Division, 2727 Kurtz Street, San Diego, CA 92110. Phone (800) 854-2658. In California (619) 291-4211. TWX (910) 335-1241.

GOULD Electronics

Mixed Reports Filed on Layout Of Comdex '83

(Continued from Page 157)

Comdex on the basis of early signup, the number of years they've exhibited and prompt payment records, Katzeff said. Space in the Apparel Mart was assigned after the World Congress Center was full, he said.

Katzeff said Interface is open to suggestions on improving Comdex and will make changes that "sound reasonable" for future shows.

"We don't feel we failed. We feel that we significantly succeeded. We think people were happy, and they said that by signing up for next year," he said, noting that about 625 exhibitors have signed up for the spring 1984 show.

About 32,000 people attended the show, making it the largest in Comdex history, according to incomplete tabulations by Interface. Katzeff said complete figures would show that attendance was much higher.

Exhibits for the next show, Comdex Fall '83, to be held in Las Vegas in November, will be divided among four halls and possibly some mobile units set up on a parking lot next to the main convention center.

Next year's spring show, to be held here again, will be spread out into the Atlanta Merchandise Mart, in addition to the Apparel Mart and World Congress Center, he said. The Merchandise Mart is adjacent to the Apparel Mart, with the World Congress Center about a 10-minute walk away.

Wilker, of the protester's group, said show promoters need to be better prepared for the expansions.

"We feel that The Interface Group didn't promote the Apparel Mart appropriately," he said. "The crowds were just not coming, and that means losing a lot of business."

Several exhibitors agreed.

"I think the biggest problem was that there's nothing to draw people over here but the exhibits," said Bob Love, marketing support manager for Rexon Business Machines of Culver City, Calif.

Al Rocheleau of Trilog, Inc., of Irvine, Calif., said it was too soon to tell if the trip to Comdex was worthwhile. "But my gut feeling," he said, "is that if we don't get into the main hall next time, we won't be here."

Others said the Apparel Mart crowd size was just right. "We've had enough traffic here to keep us busy," said one exhibitor. "Any more and we'd have been swamped."

Cliff Emerick of Duosoft Corp., Savoy, Ill., said the smaller crowds in the Apparel Mart gave him more time with customers. "We really prefer it this way," he said.

Supershorts

Dataquest, Inc.'s Display Terminal Industry Service is sponsoring its first conference, "Display Terminals: Growth Opportunities and Challenges 1983-87," June 22-24 at the Del Monte Hyatt Hotel in Monterey, Calif. Speakers will include Edward J. Kfoury, IBM; Arthur T. Campbell, Digital Equipment Corp.; Robert Degan, Falco Data Products, Inc.; and Karen Nussbaum, executive director of 9 to 5, National Association of Working Women.

* * *

Honeywell, Inc. will open a public videotex demonstration and support center in Chicago in mid-1983. Reported to be the first of its kind in the country, the center will feature two Honeywell DPS 6 small computers running Teletel videotex packages provided by **Videographic Systems of America.** The center will also develop new videotex simulations and models and serve as a benchmark test site and training resource for prospective customers.

* * *

Digital Equipment Corp. has named **Entre Computer Centers, Inc.** as a nationally authorized distributor of its Professional and Rainbow computers. Entre, a franchiser of retail computer centers, has approximately 70 centers open or under development in 20 states.

* * *

RCA Astro-Electronics of Princeton, N.J., has been awarded a contract by **American Satellite Co.** for the construction and launch support of two commercial communications satellites. The contract has a potential value of over $100 million.

* * *

Dynamicro Software Corp. has signed a licensing agreement with **Via Computer, Inc.** that will permit a version of Via's Prophit II financial modeling software to be marketed as an integrated module of The Business Library accounting/management information system. The microcomputer software products of Dynamicro Software are marketed through retailers under exclusive license by **Software Libraries, Inc.,** a co-licensee in the agreement, using the name The Business Library.

* * *

Control Data Corp. has signed a letter of intent to invest in the Reader's Digest Association, Inc.'s videotex subsidiary, **Source Telecomputing Corp.**

* * *

Honeywell, Inc. has signed an agreement with **Masstor Systems Corp.** for the development and marketing of Masstor's Massnet and shared virtual-storage system on Honeywell's Gcos 8-based, large-scale computer systems.

* * *

John S. Cullinane, chairman of the board and chief executive officer of **Cullinet Software, Inc.,** has been selected to chair Northeastern University's College of Computer Science Industrial Advisory Committee.

* * *

AST Research, Inc., developer of hardware and software for business firms using the IBM Personal Computer, has formed a Systems Marketing Group. Dr. Jerry Orosz has been appointed director of the unit.

General Instrument Corp.'s Data Systems Service Division will provide customer maintenance services for **Sytek, Inc.'s** broadband local-area network under a recently signed agreement.

* * *

United Technologies Corp. has awarded MIT a three-year, $750,000 grant for the school's microelectronics research program.

* * *

Software Research Co. has released "Micro Software Distributors: A Sourcebook for Publishers Seeking New Markets." The directory contains profiles of over 150 companies seeking programs for resale and is available through Drawer 1, P.O. Box 9524, Washington, D.C. 20016.

Management Assistance, Inc. (MAI) has signed a letter of intent with **General Automation, Inc.** for MAI/Sorbus to provide computer service and maintenance to all of General Automation's U.S. customers.

* * *

Decision Resources, Inc. has signed a distribution agreement with **Nippon Information Sciences, Ltd.** to provide personal computer software graphics programs that have been adapted for the Japanese market.

* * *

Gould, Inc.'s SEL Computer Systems Division has donated a Concept 32/8750 computer system, valued at $477,000, to the Research Triangle Institute. Discounts of up to 30% on Gould products are available to other qualified universities.

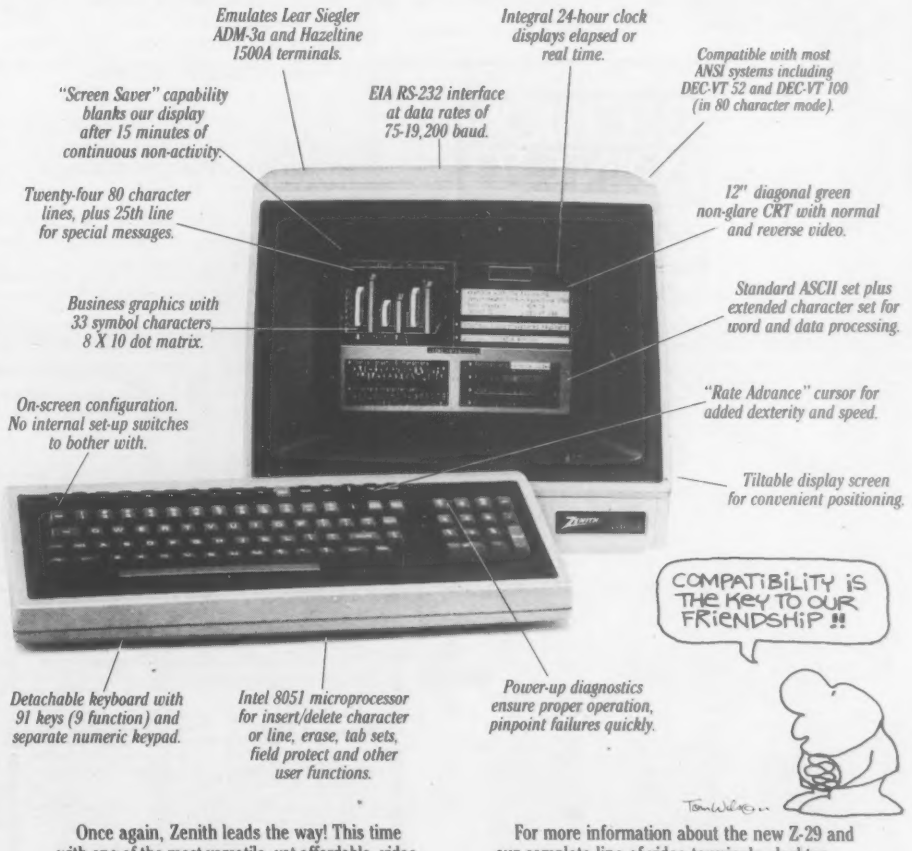
* * *

Data General Corp. has announced an agreement with **Software International Corp.** to promote and market Software International's general ledger and financial reporting system for use on its Eclipse MV/Family systems.

* * *

NCR Corp. is donating several computer-based systems for food service management to the Michigan State University School of Hotel, Motel and Institutional Management. The systems are scheduled to be installed before the beginning of the fall term.

Meet the compatible, affordable Zenith Z-29.


Emulates Lear Siegler ADM-3a and Hazeltine 1500A terminals.
Integral 24-hour clock displays elapsed or real time.
Compatible with most ANSI systems including DEC-VT 52 and DEC-VT 100 (in 80 character mode).
"Screen Saver" capability blanks our display after 15 minutes of continuous non-activity.
EIA RS-232 interface at data rates of 75-19,200 baud.
Twenty-four 80 character lines, plus 25th line for special messages.
12" diagonal green non-glare CRT with normal and reverse video.
Business graphics with 33 symbol characters, 8 X 10 dot matrix.
Standard ASCII set plus extended character set for word and data processing.
On-screen configuration. No internal set-up switches to bother with.
"Rate Advance" cursor for added dexterity and speed.
Tiltable display screen for convenient positioning.
COMPATIBILITY IS THE KEY TO OUR FRIENDSHIP !!
Detachable keyboard with 91 keys (9 function) and separate numeric keypad.
Intel 8051 microprocessor for insert/delete character or line, erase, tab sets, field protect and other user functions.
Power-up diagnostics ensure proper operation, pinpoint failures quickly.

Once again, Zenith leads the way! This time with one of the most versatile, yet affordable, video terminals ever produced: the Zenith Z-29.

Not to keep such a talented terminal all to ourselves, we've made it compatible with most existing systems. It can handle just about any software application. And it's priced to meet even the most demanding budgets.

Behind every Zenith product is our regionalized distribution network. This assures you the best in service and support, as well as the fastest possible delivery.

For more information about the new Z-29 and our complete line of video terminals, desktop computer systems, monitors, peripherals and software, see your nearby Zenith Data Systems distributor. Or call (800) 323-5924. In Illinois, call collect (312) 391-8861.

ZENITH | data systems

The quality goes in before the name goes on.

©1983 Universal Press Syndicate

Nickels & Dimes

Cincom Systems, Inc. has reported revenues of $54.4 million for fiscal year 1982, an increase of 30% over 1981. Net profits increased by 220%, while earnings per share more than tripled.

$ $ $

Compaq Computer Corp. has raised more than $20 million in its third round of private equity financing. The firm has also secured a $10 million revolving line of credit from Interfirst Bank Houston.

$ $ $

Gould, Inc. has reported that first-quarter net earnings for the period ended March 31 declined 27% to $14.1 million, or 32 cents per share, from $19.4 million, or 44 cents per share, for the same period in 1982.

Computer Consoles, Inc. has reported a 28% decline in revenues and a net loss of $2.1 million, or 39 cents per share, for the three months ended March 31, compared with last year.

$ $ $

Rolm Corp.'s has reported earnings for the third quarter ended April 1 of $146 million and sales of $125 million, up 42% and 25%, respectively, over last year.

$ $ $

For the six months ended Jan. 2, **Centronics Data Computer Corp.** has announced net sales of $82.4 million with an after tax loss of approximately $18.6 million.

$ $ $

Cray Research, Inc. has reported revenues of $27.5 million and net earnings of $2.16 million, or 15 cents per share, for the first quarter ended March 31, compared with $23.3 million, or 12 cents per share, for the comparable period last year.

$ $ $

Mentor Graphics Corp. has raised $7.2 million in its third round of venture capital funding from 15 firms led by original investors Venrock Associates, Sutter Hill Ventures and Greylock Management.

$ $ $

Harris Corp.'s income for the third quarter, ended April 1, declined 6% from the same period last year while sales increased 7%.

$ $ $

NBI, Inc. has reported a net loss of $3.5 million, or 34 cents per share, on revenues of $23 million for the third fiscal quarter ended March 31, compared with net income of $2.6 million, or 29 cents per share, on revenues of $25.1 million for third quarter 1982.

$ $ $

Northern Telecom, Ltd. has reported unaudited consolidated revenues for the first quarter 1983 were $774 million, up 7.9% from 1982 first quarter. Net earnings, before an extraordinary gain, were up 42% for the same period.

$ $ $

The Reynolds & Reynolds Co. has reported a 50% increase in net profits during the second quarter of fiscal year 1983 and sales of $66.2 million, up 7%, for the quarter.

$ $ $

Paradyne Corp. has reported revenues for first quarter, ended March 31, were $54.6 million, up 21% from the same period a year ago. Net income after taxes was $5.5 million, a decline of 3%. Legal expenses in the first quarter in connection with a Securities and Exchange Commission investigation and suit against the company were approximately $300,000.

$ $ $

Timeplex, Inc. has reported third-quarter revenues of $11.2 million, 39% ahead of revenues for the third quarter last year. Net income was $1 million, compared with $390,000 for last year.

$ $ $

Computer Sciences Corp. has reported that earnings were flat during the year, with net earnings of $17.9 million, or $1.32 per share, for 1982.

Telecommunication Challenges & Decision Points:
Divestiture. New Vendors. New Products. New Prices.
New Markets. Exploding Opportunities...&...Risk:

Survive Through Strategic Planning

TELECOMMUNICATIONS
DECISION POINT 83
NEW YORK CITY
JUNE 7, 8, 9, 1983
Columbia University Club

Presented by:

The DMW Group, Inc.
A Doll Martin Company

COMPUTERWORLD On Communications

COMMUNICATION NETWORKS

Why You Should Attend:
DecisionPoint 83 is a three day conference dedicated to exploiting the tremendous opportunities and minimizing the inevitable risks in the Telecommunications Industry. The User Group, Vendor Group and the Investment Community should attend.

Day One: $295
The State of the Industry:
Industry leaders will provide a comprehensive analysis of the industry.

Day Two: $395
Assessing the Environment:
Leaders of major vendors will present their views of new products and services you can expect in the next critical years.

Day Three: $495
Strategic Planning in Detail:
A hands-on workshop on strategic planning methodology.

Full Three Day Program: $995

Limited seating.
Register Now:

Speakers:

Dr. Dixon R. Doll
Pointing the way

Richard E. Wiley
Right to the Point

W. G. McGowan
MCI's Point of View

Ivan Wolff
The Marketing Points

H. Hershkowitz
Chase's Plan

Ben Scott
GTE's Plan

Detach this form and return to:
CW Conference Management Group
Box 880 Framingham, MA 01701
Or call Toll-Free:
1-800-225-4698
☐ Please send more information only.

Please register me for:
☐ **Day 1** ..... **$295.**
☐ **Day 1 & 2** ..... **$645.**
☐ **Day 3** ..... **$495.**
☐ **Day 1, 2, 3** ..... **$995.**

Bill to:
Name
Company
Address
City State Zip
Telephone

Printer Makers Enter Retail Mart

(Continued from Page 158)

major focus.

Alphacom, of Campbell, Calif., began a retail marketing program in January for its newest product, the Alphacom 42. A second 80-col. printer, to be introduced in June, will also be available to dealers for retail sale by fall.

"This new retail arm has the opportunity to explode because of the uncertainty of the marketplace right now," said Bill Sobieski, vice-president for consumer marketing and sales.

The firm will maintain its OEM marketing branch for its other lines of thermal printers, print mechanisms and controllers because that channel is consistently profitable, he said.

'I'm Sorry, Sir, But the Computer Seems to Have Lost Your Reservation...'

POSITION ANNOUNCEMENTS

SHIFT YOUR COMPUTER CAREER BACK INTO GEAR

Many computer professionals, who have been waiting for some time to move to new positions, have been reluctant to act because of the past, poor economic climate. Now, however, as we emerge from the recession, increasing numbers of computer professionals are showing renewed interest in their career advancement . . . and for good reason.

The demand for computer professionals is growing rapidly. Most of our NCA firms have reported that clients, long dormant, are once again looking for qualified people. As a result, we can now show you more career opportunities than you'd believe possible . . . both locally and nationally.

Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. Company clients assume our fees so there is no charge to you ever.

Now is the time to shift your career back into gear, and with NCA's specialized services, we'll have you back on the road to successful advancement.

ATLANTA: BAI Limited
229 Peachtree Street, Suite 1601-C
Atlanta, Georgia 30303 (404) 581-0040

BOSTON: Robert Kleven and Co., Inc.
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020

CHICAGO: Thos. Hirtz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1555

COLUMBUS: Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0926

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8600

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33024 (305) 434-6112

HARTFORD: Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240

HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100

INDIANAPOLIS: Computer Personnel Services, Inc.
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712

KANSAS CITY: DP Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-8288

MILWAUKEE: EDP Consultants, Inc.
7332 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-0077

MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-6714

NEW JERSEY: Systems Search
90 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4400

NEW YORK: Botal Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370

NEW YORK UPSTATE:
CFA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5225

NORTH CAROLINA: DataMasters,
Div. of TaskForce, Inc., P.O. Box 6888
Greensboro, North Carolina 27405
(919) 373-1461

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-8880

PHOENIX: Professional Career Consultants
4628 North 17th Street, Suite H101
Phoenix, Arizona 85016 (602) 274-6666

SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535

SEATTLE: Houser, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700

WASHINGTON D.C.: ESP Systems Corporation
914 Lamberton Drive
Silver Spring, Maryland 20902 (301) 649-6171

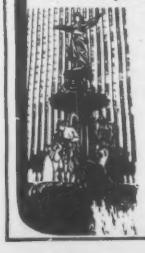
Call the NCA firm nearest to you for Salary Survey and Relocation Information

National Computer Associates

ONLINE SYSTEMS DESIGN EFTS

Electronic Funds Transfer Systems are shaping the financial services industry. Midwest Payment Systems is committed to the development of large scale IBM online systems directed towards servicing the financial and retail community. At MPS we are proud of our history of innovative network design. Today we represent one of the 10 largest ATM networks in the U.S. with 1500 SNA terminals linking 64 banks, savings & loans and credit unions in 8 states. Fewer than 20 banks in America can offer such total data switching capability. With our sophisticated Switch and emergence into Point of Sale processing, expansion is limitless.

As a result we are soliciting Senior Systems Analysts experienced in the total design of IBM online application systems. Qualifications include 3-5 years OS Assembler language in a SNA/SDLC environment. In addition to providing software support for the data communications network, duties include development in an organization offering the highest technical challenge. Your management capabilities will also be realized through project responsibilities and personnel administration. MPS offers an excellent salary, company paid profit sharing and full relocation.



Qualified candidates interested in learning more about MPS opportunities should forward resume to Gregg Fitzgerald, Midwest Payment Systems Division, The Fifth Third Bank, Dept. 00828, Fifth Third Center, Cincinnati, OH 45263.
(513) 579-5289.

An Equal Opportunity Employer M F

SR P/A
SR S/A
CALIFORNIA

Our client, a Fortune 500 Blue Chip, mfg concern has immediate staffing need for one of their operating divisions in No. California. The P/A positions req: 5+ yrs in DP; 3+ yrs prog in COBOL on mainframe IBM under VS 2 or MVS; 2+ yrs prog IMS/DB; MVS, JCL & MVS utilities; financial &/or mfg application exp. The S/A positions req: 5+ yrs in DP; 2+ yrs application system design & development exp; fin'l &/or mfg areas; database design bkgd with IMS/DB; project control & mgmt. Superb bnfts & liberal relocation pkg avail. Only appropriate work histories will be forwarded.
$40,000 FEE PAID

ROBERT HALF OF NEW YORK, INC.
522 Fifth Avenue
New York, N.Y. 10036
212-221-6500 (agency)

PROGRAMMER/ANALYST

Due to expansion an opening exists within the BHHS Data Center for a Programmer/Analyst with 2-3 years experience developing COBOL business applications in a VM/MVS environment, CICS exposure essential.

The BHHS Data Center supports the growing DP needs of BHHS member hospitals and health care facilities in Arizona.

We offer excellent salary and competitive benefits. Please submit resume and salary history in confidence to:

Corporate Human Resources
Baptist Hospitals & Health Systems
2224 W. Northern Ave.
Suite D-300
Phoenix, AZ 85021
Equal Opportunity Employer

MANAGER—DECISION SUPPORT SYSTEMS

Abbott Laboratories is a leading international manufacturer of health care products. We are presently seeking an experienced, entrepreneurially-oriented professional to establish and manage the decision support services function for one of our major operating divisions.

Leading a team of systems consultants, the individual selected will be responsible for the development of decision support systems to maximize the effectiveness of our customer relationships. This responsibility involves assessing the information needs of both the company and our customers, supervising the selection and development of the hardware and software required to meet those needs while lending expertise and support of our marketing effort.

Qualified applicants should possess a minimum of 10-15 years significant experience in all phases of information management, coupled with exceptional communication skills and conceptual abilities. This background should include a knowledge of mini and microcomputer systems and their application to business issues such as sales forecasting, logistics, production planning and customer service. Previous experience in the management of consulting and vendor relationships is highly desirable. While all candidates should be degreed, an MBA is preferred.

In addition to the outstanding career potential associated with a $2.6 billion corporation, Abbott provides an excellent salary and a comprehensive benefits program which includes profit sharing and a stock retirement plan. We are headquartered in an attractive suburban setting on the Lake Michigan shoreline, just 30 miles north of Chicago. For prompt consideration, submit a resume with salary history, in complete confidence to: **Robert Levy/Corporate Placement.**

ABBOTT
ABBOTT PARK ILL. 60064
"HEALTH CARE WORLDWIDE"

Abbott is an Affirmative Action Employer

DISCOVER SOHIO

Through ownership of the Alaska North Slope leases, Sohio is one of the nation's largest owners and producers of domestic crude oil. At Sohio, we know where we're going, and we know the kind of creative professionals it will take to get us there.

DALLAS, TEXAS

Geophysical Data Center

Our Geophysical Data Center based in Dallas, boasts some of the most advanced computer hardware for seismic data processing and display. We are presently seeking the following professionals to join in Sohio's effort to establish itself as an industry leader.

Geophysical Software Professionals

Several openings exist in the following areas:

- **Seismic data processing software development**
- **Geophysical mapping and data base software development**
- **Geophysical applications software development**
- **Operating systems software and communications software specialists**

Expertise in one or more of the following areas is highly desirable:

- **At least 2-5 years geophysical software development experience**
- **DISCO seismic processing software experience**
- **Software development on minicomputer systems (DEC desirable)**
- **Scientific software development on vector processors**
- **Interactive graphics software development**
- **DEC VMS or TOPS 20 operating systems experience**

Candidates should possess a BS advanced degree in Computer Science, Mathematics, Geophysics, Physics, Electrical Engineering, or a related field.

HOUSTON, TEXAS

Commercial Data Processing Center

We have recently established our Commercial Data Processing Center in our Houston Headquarters offices. As a result, we are seeking MIS professionals to support our state-of-the-art IBM environment. We are presently seeking:

IBM Systems Programmers MVS/JES 2

Applicants must have at least 5 years sytems programming experience in 5 or more of the following areas:

- **OS/MVS**
- **JES 2 and/or JES 3**
- **IMS**
- **CICS**
- **DL/1**
- **VSAM**
- **SNA-SDLC**
- **VM**
- **VM/CMS**
- **DBMS**
- **TSO**

These immediate opportunities require highly competent, creative and dedicated individuals capable of developing and maintaining a depth and breadth of knowledge in the areas described.

Consider joining Sohio where the compensation package is outstanding including **one of the best relocation programs in the industry.** If you are interested and have the qualifications required, we would welcome your resume including salary history, which should be sent to:

DALLAS
Dan Allman
SOHIO PETROLEUM COMPANY
5400 LBJ Freeway, Suite 1200
One Lincoln Centre
Dept. CW6
Dallas, Texas 75240
(214) 960-4227

SOHIO

HOUSTON
MIS Recruitment Manager
SOHIO PETROLEUM COMPANY
P.O. Box 4587
Dept. CW6
Houston, Texas 77210

Sohio Petroleum Company is an equal opportunity employer m/f/h/v.

UNIVERSITY OF EVANSVILLE

Two tenure track appointments involving undergraduate and graduate teaching in small, private, residential, regional university are available for September 1983. Ph.D. in computer-related discipline required for associate professor appointment. Previous teaching experience is required and business applications experience is preferred. Outstanding undergraduate applied computer science program serving 300 students and innovative teacher-oriented masters programs are housed in the School of Engineering and Applied Science. Competitive 9-month salary in attractive urban location. Excellent opportunities for supplemental compensation and for off campus assignments. **Contact Dr. William Mitchell, Chairman, Department of Computing Science, P.O. Box 329, Evansville, IN 47702 by June 15, 1983.** *AA/EOE*

AVAILABLE NOW

Manager of Systems 4341	$55K
Systems Scientist	$31-37K
Systems Prog. Super. CICS	$45K
Project Leaders	$33-38K
Cobol Programmers	$21-35K
RPG Programmers	$18-26K
Programmer/Analysts	$27-40K
Fortran Progs. Bus. Sci.	$25-30K
Operations Managers (3)	$25-38K

All fees, relocation and interviewing costs are paid by our client companies. For details on any of our current openings call or submit a resume to:

Ethan Allen Personnel Agency
30 W. State St.
Binghamton, NY 13901
(607) 772-1560

SYSTEMS PROGRAMMER/ANALYST

Our computer center operates DEC20/60 to fulfill instructional and scientific data processing requirements. The Systems Programmer-/Analyst must be able to supervise and interact with student programmers and employees, direct program conversion efforts and communicate effectively with faculty and staff.

A BS in computer science is desirable and 2 years experience in TOPS-20 and MACRO and programming at the systems level is required.

Apply to Personnel Dept., New Mexico Institute of Mining and Technology, Campus Station C, Socorro, NM 87801.

an equal opportunity/affirmative action employer

DATACOMMUNICATIONS SPECIALISTS
$45,000-$65,000

Join the Scientists building the office of the future. Beautiful southern location. Excellent potential for technical management of network development projects. Degree required.

Send resume to Ed Simmons
Belle Oaks
Ste. 700, 1125 Grand
Kansas City, MO 64106
(816) 421-7181
Employment Agency

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—let us update you on the rapidly changing UNIVAC market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF ALBUQUERQUE, INC.
1717 Louisiana NE, Dept. C
Albuquerque, NM 87110
(505) 262-1671
Exclusively Employer Retained

INTERNATIONAL AND NATIONAL EMPLOYMENT OPPORTUNITIES

We currently represent clients with needs in the following areas:

SYSTEMS ANALYSTS	All areas
PROGRAMMER ANALYSTS	PL1, FORTRAN, COBOL
DATA BASE ANALYSTS	Model 204, IMS
SYSTEMS PROGRAMMERS	MVS, VM/CMS, IMS
EDP TRAINERS	Programming/operations
SOFTWARE SPECIALISTS	SIMPLAN, ACF2, GRAPHICS

Send your resume or call C. Reilly or G. Lieb at (713) 658-9898.

ALL FEES ASSUMED BY CLIENT COMPANIES

M. DAVID LOWE PERSONNEL SERVICES
8117 Richmond Avenue
Houston, Texas 77057

PROGRAMMER ANALYST NCR MAINFRAME

Large Orange County New York firm has immediate opening for a Programmer Analyst. Requires a degree in business data processing, minimum of 3 years experience on NCR mainframes, some micro computer experience, and good communication skills. Project management experience is highly desirable. We offer salary commensurate with experience, and outstanding fringe benefit program, and personal growth potential.

Reply to CW-B4159
Computerworld
Box 880
Framingham, MA 01701

IBM TERMINAL-ORIENTED SALES FORCE WANTED

To sell a unique, unannounced, U.S. made terminal-of-tomorrow product family to 3270 network users.

The product line features:

- LOW COST 3178-COMPATIBLE DISPLAY TERMINAL
- 3270 BSC/SNA PLUS NON-IBM ASYNC
- IBM PERSONAL COMPUTER ATTACHMENT

These products are in shipment and beta test now. To find out how to represent us in local, regional or national markets, describe in detail your sales organization's capability in IBM mainframe market sales, and send to:

CW-B4157
Computerworld
Box 880
Framingham, MA 01701
E.O.E.

Computer Professionals
Northeast Opportunities

Sr. Engineer-Software	To $56K
Sr. Engineer-Data Systems (exp. w/military systems required)	To $51K
Supervisor-Systems Engineering & Software	To $40K+
Analyst-Systems Software	To $38K
Programmer Analyst	To $25K

If you desire the highest caliber of professional representation send your resume in complete confidence to: Kevin M Stack, President

KMS Associates, Inc.
UPO Box 3492, Kingston, NY 12401
914-339-3559

SOUTHERN OPPORTUNITIES

P/A Bking COBOL OS/Batch	$27K
S/A FORTRAN or ASSM Minis	$28K
P/A RPG II and COBOL Sys 38	$25K
P/A COBOL CICS Life Ins	$32K
CICS S/P MVS COBOL/ASSM	$35K
Sr CICS Sys Prog DOS/VSE SNA	$32K
Sr Prog HP 3000 COBOL RPG+	$27K
IMS DB COBOL Saudi Arabia	$ OPEN

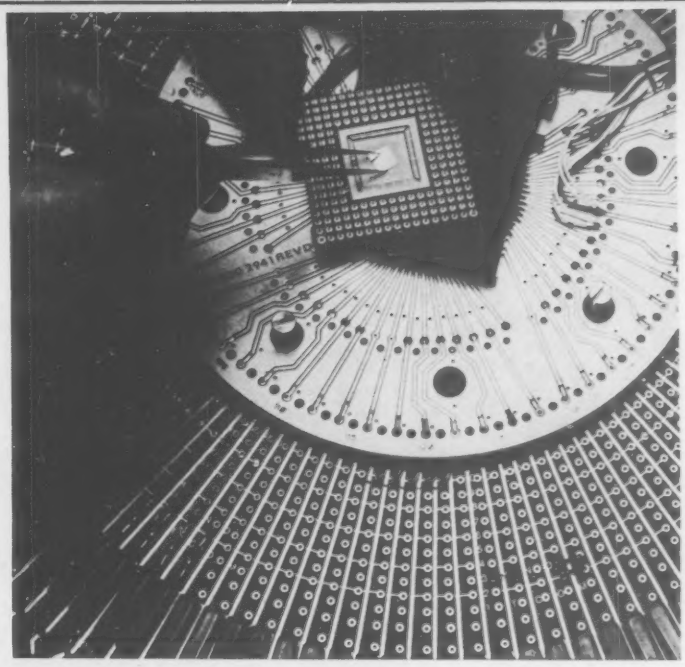
ROBERT HALF OF LOUISIANA, INC
P.O. Box 57629
New Orleans, LA 70157
(504) 835-4296

PROGRAMMER

For professional association located in Palo Alto, CA. MS Computer Science preferred. Documentation experience required. Experience on HP 3000 and Quasar Powerhouse products (Quick, Quiz, QTP, Qschema). Ability to design, write, and implement business applications. Good company benefits. Salary commensurate with experience. Please send resume and salary history in confidence to:

CW-B4160
Computerworld
Box 880
Framingham, MA 01701

Excellence. Innovation. Progress.



Burroughs is a recognized leader in one of the world's most dynamic and innovative businesses — the electronics-based information management industry. We have a reputation of excellence and quality.

Our company has developed the expertise and capability to become a complete source for a family of products. Including computer systems, office automation products, and application software. Just to name a few.

It has been forecast that by the year 2000 our industry will be the largest in the world. Ever increasing job opportunities seem to reflect this popular opinion.

Pasadena

We are a leading designer and manufacturer of commercial computer systems. As a key contributor to Burroughs' world leadership in Information Management, we offer high levels of individual recognition, mobility and fast-paced development programs. Our facility is located near the hills of Pasadena, home of the Rose Bowl.

Systems Programmers

Requires accomplished programmers with BS/MS in Computer Science or related field. Opportunities exist for: **Compilers ● Operating Systems ● Software Development Environments ● Database Management Systems ● Networking ● Simulation ● Modeling ● Statistical Analysis ● Computer Architecture.**

Senior Systems Programmers

Requires 2-3 years programming experience on microprocessors. Assignments on intelligent workstation.

Management Systems Analyst

Candidate should have working knowledge of computer concepts, including programming, database design, and information systems. BS in Computer Science, Business Administration or Information Systems.

Management Systems Database Administration

Must have working knowledge of computer concepts, including programming, databases, information systems, hardware configurations, and data communications. Exposure to state-of-the-art technical knowledge and business systems in manufacturing environment also required. BS/MS in Business Administration or Information Systems.

Support Systems Programmers and Analyst

Applicants with 2-3 years experience in support positions, please apply. Requires accomplished programmers with exposure to high level languages and operating systems. BS/MS in Computer Science or related field or equivalent experience.

Systems Writers

Requires data processing background. BA/BS in related field or equivalent experience. Will be responsible for developing and writing user documentation.

Senior Engineer, Product Assurance

Responsible for evaluating and qualifying new computer mainframe designs before release into production. An excellent opportunity for quality-conscience engineers to become involved with all phases of product development cycle. Will participate in design reviews, prepare qualification test plans, evaluate designs and monitor field performance of product in user environment. Requires BS or MS in EE or CS and experience in computer evaluation, design, test or programming.

Programming Engineers

Position requires a working knowledge of both software and digital hardware design. BS/MS in electrical/computer engineering or equivalent experience. Opportunities exist in Diagnostic Programming, Microprocessor Based Design, and Computer Aided Engineering or Design (CAD).

For confidential consideration, send your resume to: **Professional Employment, Dept. CW003, 460 Sierra Madre Villa, Pasadena, CA 91109.**

Mission Viejo

Our Mission Viejo facility is a leading designer and manufacturer of medium to large-scale computer systems for information management. Burroughs' Systems Development Group in beautiful Orange County is located 50 miles South of Los Angeles.

Systems Programmers

Assignments are on a project basis which means greater opportunity for responsibility and advancement. Excellent opportunities exist in the following areas: **Operating Systems ● Computer Network Architecture ● Data Communications ● Interactive Debugging Tools ● Compilers ● Message Control Systems ● Program Generators ● Computer Architecture ● Advanced Database Management (Relational and Distributed) ● Distributed Processing (Local and Wide-area Networking).** A BS or MS in Computer Science or related field with one or more years applicable experience preferred.

Engineers

System Modeling — position involves performance modeling and performance evaluation of mainframe systems. Requires 2-3 years in computer systems modeling.

Microprogramming — responsibilities include designing and implementing Intel 8086-based applications. Requires 2-3 years with Intel IRMX operating system and Intel Languages (Pascal, PL/M, Assemblers).

Software Documentation

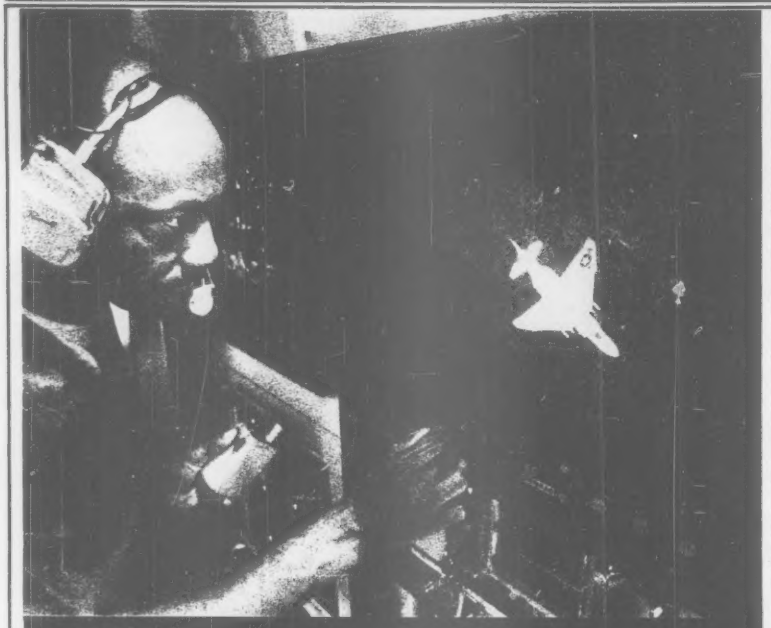
Involves the production of new documentation and the updating of existing documentation for system environmental software products. Ideal candidates will be skilled writers and will have a background in both communications and computer science, including a Bachelor's or Master's degree in Technical Communication, Computer Science, or Journalism.

For confidential consideration, send your resume to: **Professional Employment, Dept. CW002, 25725 Jeronimo Road, Mission Viejo, CA 92691.**

We offer competitive salaries, excellent benefits and rewarding assignments in our small team atmosphere.

An Affirmative Action Employer M/F

Burroughs



Northrop...
The Software Builder.

Northrop people build more than aircraft. Some are building the software framework of the Aircraft Division. Everyday, software systems specialists are becoming increasingly involved in every facet of our operations. Our software development staff is meeting the challenges posed by advanced aircraft systems design, expanding simulations activity, improved business operations integration and on-going operations research. If you're a qualified professional with experience in the areas listed below, consider joining our innovative software team.

Avionics Software Design/Systems Integration
Business Systems Analysis/Applications Programming
CAD/CAM & N.C. Systems Design
Data Base Design & Administration
Flight Control Systems Analysis & Design
Flight Test Software Design
Operating Systems Development
M.I.S. Strategic Planning

We're located near LAX in Hawthorne, CA. Our benefits package is excellent, including company-paid medical and dental insurance, 12 paid vacation days per year, and an outstanding company-contributed savings/investment plan. For immediate consideration, please submit your resume and salary requirements to:

Cris Cristina
Northrop Aircraft, Hawthorne Facility
Dept. 1222/80 NA-CW 48322
P.O. Box 2282
Hawthorne, CA 90250

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

Aircraft Division
NORTHROP
Making advanced technology work

FEDERAL EXPRESS... YOUR LINK TO THE FUTURE.

Step into our fast-paced environment, and help us as we pioneer new dimensions in high technology. Our leadership in overnight movement of high priority business goods and documents presses us to continue to advance our sophisticated data processing systems, and has created the need for talented individuals to fill the following positions:

Memphis and Colorado Springs:

PROJECT MANAGER (DJ-61)

- Bachelor's degree in Engineering or Computer Science
- 6 years in data processing/telecommunications/computer manufacturing
- Experience designing and maintaining microprocessor based systems

TECHNICAL ADVISOR (DJ-62)

- Bachelor's degree in Engineering or Computer Science
- 7 years experience in computer systems, preferably microelectronics software/hardware development
- Technical lead experience preferred

ENGINEER/SR. ENGINEER (DJ-63/DJ-64)

- BSEE or BSCS
- 2 to 4 years in developing microelectronic hardware systems
- Knowledge of hardware and microelectronic software languages/applications

PROGRAMMER ANALYST/SR. PROGRAMMER ANALYST (DJ-65/DJ-66)

- Bachelor's degree in Computer Science or Math
- 3 to 5 years experience developing software systems, primarily on microelectronics hardware
- Knowledge of hardware components

Memphis:

INFORMATION CENTER ANALYSTS (RS-3/RS-4)

Programmer Analyst/Sr. Programmer Analyst

- Bachelor's degree/equivalent in Computer Science, Math, Engineering or Business
- 3 to 5 years programming experience with 2 to 4 years in Systems Development
- Previous experience on IBM operating systems
- Demonstrated skills in 2 or more of the following languages: FOCUS, SAS, EMPIRE, ANSWER/2 preferred; 1 required
- Knowledge of Tell-A-Graf and STAIRS products preferred

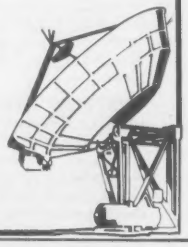
At Federal Express, you'll find an excellent salary, extensive benefits, and a dynamic atmosphere of professional interaction and high productivity. Send your resume and salary history today, in confidence, to:

Suzanne Gaal
FEDERAL EXPRESS CORPORATION
P.O. Box 727 - Dept. 3171
Memphis, TN 38194

TO BE CONSIDERED, YOU MUST INDICATE THE JOB NUMBER OF YOUR POSITION OF INTEREST ON YOUR RETURN ENVELOPE.

Equal Opportunity Employer M/F

FEDERAL EXPRESS



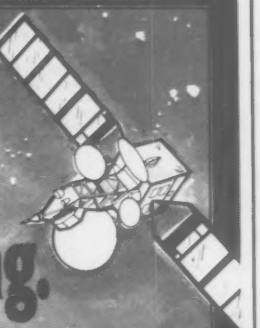
RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

FORD AEROSPACE IN THE BWI CORRIDOR

You don't add a new 80,000 square foot building unless you're up to something.



We are.

Our second building in the BWI Corridor is complete. A large portion of it will contain a major, state-of-the-art facility devoted to Instructional Systems Development programs of unprecedented scope and rigor.

Growth plans for the future are no less aggressive than our growth record of the past— from an 18-person, start-up operation in 1980 to over 200 by 1982 year-end. If anything, the pace is now quickening.

And whether you look at our groups involved in systems engineering, software, integration and test, training, life cycle engineering, or technical support, there is not a single area here that we are not actively staffing.

Sometimes we may appear to be more specific than necessary.

While conventional lists of opportunities enable you to "spot" yourself quickly in a message such as this, they can't communicate important elements of the professional challenge, the true working climate, and management style that can make all the difference to your potential for fulfillment and long-term career growth here.

So if you find a "label" you might relate to, contact us and we'll discuss the kinds of specifics that are specific to you.

INTEGRATION AND TEST ENGINEERS

This is a rapidly expanding area offering very challenging and fully professional work on large electronic systems for non-degreed (assuming you have appropriate levels of service school and hands-on experience) as well as degreed field engineers and program management specialists. Responsibilities include responsibility for physical integration and functional performance validation, integration plans, test plans, test procedures, test conduct, and test reports.

TECHNICAL PUBLICATIONS/ DOCUMENTATION

Should have 6-10 years' experience generating technical operations and maintenance manuals, drawing upon your thorough understanding of commercial and military specifications, strong background in digital and analog theory, and detailed knowledge of writing, formating and coordinating document production efforts.

INTEGRATION AND TEST ENGINEERS

Prerequisites include at least 3 years' experience in an integration and test environment, working with processing subsystems that are computer based. Should have BS or equivalent in engineering, physics, math or computer science.

Will be responsible for development and implementation of test plans and procedures, conduct of corresponding tests, and preparation of test reports.

SYSTEMS ENGINEERS

We're seeking individuals with 9 to 10 years of aerospace or electronics engineering experience, during which at least 6 years were devoted to systems engineering. You should have developed first-level management skills and be ready to assume responsibility for the integrity of major subsystems. Will work closely in planning system activities and developing requirements/specifications. Activities will extend to integration and test of subsystems and systems. MS preferred.

SOFTWARE AND SYSTEMS R&D ENGINEERS

These posts call for individuals with engineering or test backgrounds in hardware, software, or system interface. Knowledge of computer systems a definite asset, with emphasis on DEC or SEL mini's. Familiarity with communications specifications, standards and devices desirable. You will participate in requirement development, evaluate system design as it evolves, make recommendations for improvement, and move with the system into integration and test phases, with diverse travel requirements.

PROGRAMMER/ANALYSTS

Positions require training and experience with DEC VAX, PDP-11 series hardware, TSX-11D/M and VMS operating systems, UNIX, DEC PDP-11, FORTRAN and Assembly Language. Training in top down design, design analysis, and structured software is also desirable. You will be performing detailed design, development, and programming of real-time software, working from specifications. You will also participate in the translation of requirements into system concept and assist in the development and documentation of hardware/software interface definitions.

SOFTWARE ENGINEERS

Prerequisites include at least 10 years of related experience in computer science, exceptional knowledge in a specified field of computer application, ability to work without technical guidance as you analyze, synthesize, determine and recommend designs and processes to be used in or with existing or new systems.

Your responsibilities will include translating user requirements into systems concepts employing the effective use of hardware and software, developing and documenting hardware/software interface definitions, performing design studies for timing analyses, computer configuration, peripherals selection or design, and providing technical leadership in complex systems analyses involving real time and non-real time computing systems.

SENIOR SOFTWARE SYSTEMS ENGINEERS

Must have at least 8 years' direct experience in design and development of real-time software systems for such functions as hardware control, data base management, information display, scientific analysis, and communications. Experience with DEC PDP-11 series hardware desirable. Your responsibilities will include translating software requirements into structured software design, defining software interface requirements and data base structures, providing technical review and guidance to software engineers, designers, and programmers involved in top level and detailed development and installation of structured software.

MAINTENANCE TECHNICIANS AND INSTRUCTORS

We are seeking two types of experienced individuals: Maintenance Technicians and Instructors. Both require strong work background in electronics/computer systems, with particular emphasis on SEL or DEC computers.

ANALOG ENGINEERS

Must have at least 10 years' experience in design and maintenance of analog systems and subsystems, including analog recorders. Your thorough background in analog recording devices should include at least 3 years' experience in design or maintenance of video recorders. Work history must include experience directly related to analog discriminators, interfaces, and converters. Should have BSEE or equivalent in experience.

TRAINING PROGRAM DEVELOPERS

Must have BS or equivalent in training-related curriculum, electronics, computer science, digital systems, and two to four years' experience in computer systems, maintenance and one to two years' training experience using the systems approach to training (SAT, CRI, or ISD). Knowledge of DEC or SEL computers and peripherals desirable.

U.S. citizenship is required for all positions.

Telephone Michael Louden or John Tehan at (301) 796-7800 or (800) 638-9871 Toll Free.

Or, write in confidence to Michael Louden, Box T-359, Professional Staffing, Ford Aerospace & Communications Corporation, Western Development Laboratories Division, 7100 Standard Drive, Hanover, Maryland 21076.

Ford

Ford Aerospace & Communications Corporation
Western Development Laboratories Division

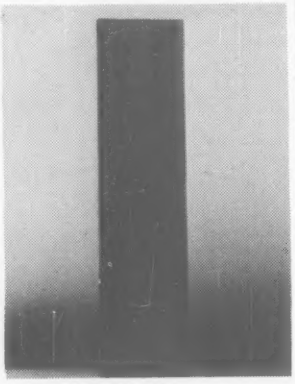
An Equal Opportunity Employer

Engineers, Programmers, Systems Analysts

Small business systems...large career potentials...that's NCR/Columbia, SC

Our Engineering & Manufacturing facility in Columbia is one of NCR's most diversified operations. We're the people responsible for the highly successful "TOWER 1632" microprocessor system. The people responsible for many of NCR's strides in data communications. The people responsible for NCR's growing position in word processing and office automation systems.

We can strategically position you in a $3.5 billion computer corporation that sees small business systems—and the people behind them—as vital to its future. If you have large ambitions in hardware or software design, match your background against our checklist. If you discover a clear fit, contact us promptly.



Sunbelt Living At Its Best

Columbia—state capital, model city, and home of the University of South Carolina—offers a choice of urban, suburban and rural lifestyles. Real estate prices and taxes are among the lowest in the country. The Smoky Mountains, Myrtle Beach, Charleston, Hilton Head Island and Atlanta are within easy reach. Professional environment...Living environment...let us tell you more about both.

See us at the BPI Technical Career Fair at the Sheraton Anaheim

SPECIAL INTERVIEWS

Monday-Tuesday May 16-17

See the NCR Representative at the BPI Career Fair in Anaheim, California

Or send a detailed resume, complete with salary history/requirements, in strict confidence to: Mr. Glenn Rannick, Engineering & Manufacturing, NCR Corporation, Dept. E55, 3325 Platt Springs Road, West Columbia, South Carolina 29169.

NCR
Complete Computer Systems

An equal opportunity employer

We have growth-created openings at several levels...All require a BSEE or BSCS and at least 3 years experience in one or more of the following:

UNIX*

- Kernel (Scheduler, Resource Management, File System)
- Utilities (System 5, Berkeley)
- 68000,68010,68020

Communication Software

- Asynchronous and Bisynchronous Protocols
- SNA
- X.25
- Cluster Controllers
- Concentrators
- Front End Processors
- Local Area Networks

Microcomputer Software

- 16/32 Bit Microcomputer Systems Definition
- Software Tools
- Operating Systems
- Real Time High Level Languages
- User Interface
- Data Base
- Diagnostics

Design Engineering

- Working knowledge of Microcomputer Systems Architecture
- Design of Hardware Interface to 8/16 Bit Microprocessors
- Logic Design Utilizing Schottky, TTL, and MOS/LSI Logic
- Fault Tolerance System Design

Word Processing/ Office Automation

- Office Systems Networks
- Office Systems Architectures
- Advanced Development of Office Products
- Application Software Development
- Integrated Voice System Data
- Third Party Software Evaluation

*UNIX—a trademark of Bell Laboratories

---

300 DP OPENINGS

Mfg Prog/Anal (Mfg appls: IMS/CICS)	25-35K
Bank Prog/Anal (Bank appls, COBOL)	20-29K
Sci/Eng Prog/Anal (Mini/Micro)	25-40K
Prog/Anal (2 yrs DEC PDP 11)	25-31K
Prog/Anal (2 yrs COBOL, UNI 1100)	23-32K
Prog/Anal (2 yrs IMS or CICS)	25-35K
Prog/Anal (2 yrs COBOL, HONEY 66)	25-34K
Prog/Anal (2 yrs HP3000)	25-30K
Prog/Anal, Sys Anal (ACP/PARS)	26-40K
Sys Anal (3 yrs IMS or CICS)	28-39K
Sys Prog (2 yrs OS or DOS/VSE)	23-39K
Sys Prog (2 yrs IMS or CICS)	27-40K
Sys Prog (UNI 1100/HONEY 66)	26-35K
DEC Sys Prog (PDP 11 or VAX)	25-40K
DEC Software Engr (PDP 11 or VAX)	25-35K
Software Engr (2 yrs Z80, 8080)	25-40K
EDP Auditor (2 yrs EDP Audit)	24-32K

In 1982 we were one of the top producers in IPA (150 agencies and 500 consultants). Now we are affiliated with NPC (130 agencies and 500 consultants). All fees and expenses paid.

Nick Young (704) 536-1800

CORPORATE PERSONNEL CONSULTANTS, INC.
3705 Latrobe Drive, Suite 310
Charlotte, NC 28211

PROJECT LEADER

Well-known computer research & development group working on state-of-the-art computer graphics systems, audio systems and film technology seeks individual to lead newly formed commercial software project. Project will include CAD software for circuit design, graphics systems, and DBMS applications. UNIX and C experience are a must. 3 to 5 years project management experience required. Developed interpersonal skills, ability to operate in an R & D environment, flexibility and willingness to take on a challenging assignment are all essential. Send resumes in confidence to **Ms. Lisa Ellis, P.O. Box 2009, San Rafael, CA 94912.**

DALLAS

LIFE INS. MGMT.

Mgr. of plans, controls, Q.A., & training staffs needed by large IBM client, degree, good track record and life ins. industry req'd. Executive position leads to VP level. To low $40's.

2720 Stemmons Frwy. 1207F
Dallas TX 75207 (214) 637-6360

DATA PROCESSING CAREERS

JCL SPECIALIST
Salary: $21,941

Experience in a large scale IBM environment with moderate command of MVS/JCL, UTILITIES & ABEND resolution. Excellent benefits & career oppty. Exposure to VSAM, TSO/SPF and VCC desirable. Resumes accepted until May 20, 1983.

Send salary & resume to:
U.S. Postal Service
N.Y. Postal Data Center
Box 210, James A. Farley Bldg.
New York, N.Y. 10099-9010
Attn: E & LR Branch

Engineers/Programmers

A Dynamite Opportunity to apply your skills to the real world!

Mergenthaler is an international leader in the innovative design and development of computerized phototypesetting equipment and systems. Explosive growth has created several challenging career opportunities for professionals.

These positions should be of interest to you if you're interested in applying your knowledge of UNIX*, local area networks, communication protocols, graphics, DBMS's, or 16-bit microcomputers to the real world—worldwide!

**Trademark of Bell Laboratories*

And, if you're looking for a chance to become involved in all stages from product conception right through to seeing your work installed at the customer's site, Mergenthaler's your kind of company.

In fact, if you'd enjoy working in an environment that consists of small project teams, lots of hard work, challenges, opportunities to learn and grow in more than just one discipline, Mergenthaler's the place you can do it all.

You can even advance your career through either management or technical stages with recognition and tangible rewards such as salary advancement and outstanding benefits. It's all here within a dynamic, international environment. And you can be part of the excitement!

The first step is to send your resume in confidence to: **Robert A. Pocsik, Director, Human Resources, Department C, Mergenthaler Linotype Company, 201 Old Country Road, Melville, New York 11747.** We are an equal opportunity employer m/f/h.

Mergenthaler
an Allied company

Software Professionals

APPLIED DATA RESEARCH, the world's oldest and largest independent systems software products company, is seeking software professionals for employment in Dallas or Princeton with experience in one or more of the following:

Software Development

- **IBM systems software development using IBM Assembler and Macro Language**
- **Personal/Micro Computer software development using 'C' language**
- **Data Base/Data Communications software development**

Software Support

- **Systems software positions available for both entry level and experienced in software product support.**

For confidential consideration send a resume to Mr. E.D. Smith, Director of Technical Recruiting, **APPLIED DATA RESEARCH, INC.**, Route 206 & Orchard Rd., CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer.

Research & Development

What's this generation coming to?

The next generation at Wang.

If you want an environment that feeds your creativity and develops your ideas, you'll thrive professionally at Wang.

At Wang, we've got the best team in the country in the best environment going. Prolific product development nurtures your work. And R&D participation in all phases of product development produces excellent products – like the Wang VS, the Digital Voice Exchange (DVX) and our new Alliance™ system.

There's room on our team for a few more of the best we can find to join us in developing future generations of Office Automation products.

SYSTEMS SOFTWARE DEVELOPMENT

VS DEVELOPMENT

The Wang VS System is a 32-bit interactive virtual memory integrated information system supporting data processing, word processing, and image processing in a fully distributed environment. The VS Development Group is responsible for present and future direction in application generators, workstations and terminals, information storage and retrieval, operating systems, interconnects, and networks.

LANGUAGES AND TOOLS

Languages and Compilers

Help develop our next generation of compilers. Design, develop, enhance and support compilers including C, PL/1, COBOL and Fortran. Produce front ends using modern technologies. Develop optimizers, code generators, and run-time systems for target systems including 32-bit VS and 16-bit microprocessors. Offers technical challenge and growth to individuals with knowledge of compiler construction and modern software development techniques, and experience in system software development and implementation of block structured languages. BSCS or equivalent experience.

RPG-II Experts

Contribute to a development effort enhancing and extending the Wang VS RPG-II compiler. Work in a small team environment to build reliable, maintainable compilers and productivity tools for programmers. Requires solid knowledge of RPG-II as an applications developer, varied design and implementation experience, some exposure to systems programming and special interest in the future of RPG. Experience with Assembler is a plus.

Software Tools

Propose and implement major new products to improve high-level language programming productivity. Be involved with documentation generation, debuggers, editors, test case generation and other program development aids. Senior level position requires extensive experience in system software design and development, with emphasis on human engineering and language support.

DBMS

Senior Software Engineers

Primary design and implementation responsibility for major architectural components of our Integrated Data Dictionary, Extended B-tree File System, Transaction Locking and Recovery System, Forms Management System, Relational Query Language, DBMS run-time system, or our non-procedural Application Generator. Requires 3-7 years' experience in systems software development. Applications development experience a significant plus. MS in Computer Science or equivalent experience.

Section Manager, Data Dictionary

Provide administrative, design and technical management for our Integrated Data Dictionary Project. Requires an exceptional level of knowledge in data modeling, information management, and data dictionary concepts. Project leadership background and a minimum of 7 years' experience in database management systems development necessary.

DISTRIBUTED SYSTEMS

Distributed Processing System is planned as a building block for the next generation of Wang office and data processing products. It will combine a network operating system with a distributed access relational database management system to provide state-of-the-art solutions to data distribution, retrieval, and archiving, all in the WangNet environment.

The hardware is a new loosely-coupled multiprocessor that incorporates high speed virtual memory 32-bit microprocessors. Software will be written in C.

Network Operating System Development

Principal and senior software engineers to participate in the design and implementation of a fully distributed network operating system. Work includes file directory management, user authorization and security issues, network topology control, data archiving systems, and network node initialization. Requires a minimum of 3-5 years' experience in operating systems development, networking or distributed processing. BSCS or equivalent.

Kernel Operating System Development

Assist in the design and implementation of a virtual memory message-based multitask kernel operating system. Principal and senior software engineers are needed to work on basic task control, demand paging of virtual memory, task address space control, intertask message systems and multitask debuggers. Requires BSCS and a minimum of 3-5 years' experience.

Leading the way in benefits.

Wang offers one of the best benefit programs in the industry, including profit sharing, stock plans, company paid dental, medical and life insurance, tuition reimbursement, our pacesetting child day care center and employee country club.

Contact us today.

Send resume with salary history to Ellen Wyman, Wang Laboratories, Inc., Dept. CW-5/16, One Industrial Avenue, Lowell, MA 01851.

We are an affirmative action employer.

WANG

The Office Automation Computer Company

Focus On Your Future With Tektronix

Engineering Computing Systems, a recently formed business unit, is responsible for the design, development, manufacture and marketing of a complete line of engineering work stations.

We are currently seeking several key individuals to join our organization. Listed below are a brief description and requirements for these key positions. In addition to the initial responsibilities listed, these positions provide high visibility and career paths to greater responsibility in both the technical field and management.

Manager— High Performance Application Development

Responsible to plan, organize and direct a high performance CAD workstation application group. This will include the development of overall strategies, programs for evaluating and acquiring application software and direct application software product implementation projects of considerable scope and complexity.

This position requires strong management skills, knowledge of CAD application and high performance application software and knowledge of systems, applications, networks and data base systems.

Software Application Engineers

Will identify engineering applications requirements, develop software application acquisition strategy, identify and qualify software vendors, and extend, modify, port and benchmark applications to run on Tek's line of engineering computing systems.

This position requires experience developing software products in both a lead and individual contributor role, familiarity with requirements analysis and third party software marketplace, knowledge of UNIX™, CPM, PASCAL, C and FORTRAN and experience proposing and developing product concepts.

Senior Software/Hardware Engineer

Provide technical leadership for an integrated set of engineering software products. This responsibility will include setting the technical direction in the areas of user interface, applications integration, the selection/determination of products and functionality for products focused at CAD/EE workstations as well as directing a group of engineers in the implementation of this direction.

This position requires prior experience in the design of user interfaces, a lead role in the design and development of a major software application product, experience with UNIX™ and the ability to focus product requirements across products and markets.

We offer a team environment where the individual is important with a company recognized for technical leadership in the fastest growing segment of the computer marketplace and in a location recognized as one of the United States' most desirable from a quality of life perspective.

If you would like to explore these start-up opportunities, forward your resume to:

Technical Staffing Manager
Engineering Computing Systems
Tektronix, Inc.
P.O. Box 1000, MS 61-195
Wilsonville, Oregon 97070

We are an equal opportunity employer m/f/h.

TM of Bell Laboratories

Tektronix
COMMITTED TO EXCELLENCE

Software Systems Opportunities

With a Johnson & Johnson Company

Ortho Pharmaceutical's progressive approach to developing and applying highly advanced state-of-the-art technology to the solution of complex business problems has created opportunities for the following professionals:

SYSTEMS ANALYST/ SR. SYSTEMS ANALYST

Positions require 3-7 years of business experience in programming or systems, including heavy user interface. Good written and verbal communications skills required to liaise between user department and data processing. Strong technical skills essential to translate business problems into technical solutions.

In addition, Senior position requires a bachelor's degree or equivalent experience, and the ability to provide independent support for large scale projects.

PROGRAMMER/ SR. PROGRAMMER

Positions require 2-7 years commercial programming experience and a thorough knowledge of COBOL. College degree or equivalent experience is preferred; familiarity with DL/1 is a strong plus.

Responsibilities include reviewing specifications; developing technical designs; writing/modifying programs for solution of general business problems. Excellent technical prowess required to recommend procedural changes and provide tech support.

Ortho Pharmaceutical Corporation, a Johnson & Johnson Company, enjoys preeminence in the health care industry. Located in Raritan, New Jersey, we offer close proximity to the cultural attractions of New York City and Philadelphia. New Jersey is an ideal place to live and work. Additionally, we're proud to offer highly competitive salaries and the comprehensive benefits you'd expect to receive from a leader in its field. Candidates for these positions should forward resume with salary history to: **Personnel Dept. CW, Ortho Pharmaceutical Corporation, Route 202, Raritan, New Jersey 08869.**

ORTHO

ORTHO PHARMACEUTICAL CORPORATION
A Johnson & Johnson Company
An Equal Opportunity Employer m/f

MAI/Sorbus Service Division:

From micros to mainframes, Sorbus has openings across the country for skilled computer technicians.

MAI/Sorbus Service Division is the nation's leader in third party computer maintenance. We are actively recruiting field service and depot maintenance personnel for our nationwide network of service facilities.

We offer repair service to computer products manufactured by over sixty companies. Our depots and carry-in service centers offer service to owners of IBM, Apple, North Star, TRS-80 P.C.'s and twenty other micro manufacturers. We established our reputation in the industry through our service of IBM mainframes (4300/370/360) and a variety of mini systems, such as the IBM System 3 and 34 and the entire line of Basic Four computer products.

We are looking for experienced technicians who would like to work for an industry leader. We offer competitive salaries, a full range of benefits and great career potential through our internal promotion policy.

For more information, call or write to:

Tom Beahm — 800-345-1262
MAI/SORBUS SERVICE DIVISION
50 East Swedesford Road
Frazer, Pennsylvania 19355
An Affirmative Action Employer

MAI Sorbus Service

Software Engineers

(Chicago Area)

We need Software Engineers for our Systems Products Division. This system greatly improves productivity of information system developers. You should have experience in the following areas:

- On Line interactive applications design
- High level language capability (PASCAL, COBOL, C and PL1)
- Compiler design
- Generation of application data dictionary system
- Structured design and programming

Degree preferred but not required. Salary to mid $40's. Interviewing and relocation expenses paid. Send resume to:

CW-B4155
Computerworld
Box 880
Framingham, MA 01701

An Equal Opportunity Employer M/F

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

COMPUTERWORLD

Engineering

The CSC Software & Systems Career Alert

COMPARE OUR GROWTH, OUR STANDARDS AND OUR OFFER

Examine the facts. Computer Sciences Corporation is the world's largest information services company. We're growing at a rate of 25% annually. Our Defense Systems Division is setting the standards and creating the prototypes for the industry at large. To add to our growth and standards, CSC has an exceptional offer for Software/Systems Engineers who want to work on a variety of sophisticated and technically challenging projects in a real-time environment. Excellent compensation. Rapid advancement potential — part of a formal career development program. The best of working environments, and where appropriate, an exceptional "total cover" relocation package.

Computer professionals who would like to advance their careers should consider the following outstanding opportunities. For immediate and confidential consideration, please call or send your resume to the individual in the location listed below that matches your interest and experience.

MOORESTOWN, NJ

Call Marlene Levick COLLECT at (609) 234-1100, or forward your resume to her attention at: CSC, Defense Systems Division, P.O. Box N, Moorestown, NJ 08057.

Participate in the development of the world's most advanced shipboard decision-making combat systems, sophisticated simulation/wargaming systems, or state-of-the-art microprocessor technology.

- REAL-TIME SOFTWARE
- SCIENTIFIC APPLICATIONS
- FORTRAN, PL/1, ASSEMBLY, "C", CMS-2
- OPERATING SYSTEMS
- MODELING & SIMULATION
- MICROPROCESSOR APPLICATIONS
- SEL, CP-901, CDC-CYBER

HUNTSVILLE, AL

Call Betty Campbell COLLECT at (205) 837-7200, or forward your resume to her attention at: CSC, Defense Systems Division, 200 Sparkman Drive NW, Huntsville, AL 35805.

You'll be involved in the design, development, implementation and test to support a high-speed passenger system for the Department of Transportation; or provide the system engineering support in tactical missile systems to include tracking technology, guidance systems, development tests, and instrumentation systems.

- CONTROL SYSTEMS ENGINEERING
- EW SYSTEMS
- SIMULATION & MODELING
- DIGITAL HYBRID & HW-IN-THE-LOOP SIMULATION
- TAL, FORTRAN, ASSEMBLY

DAHLGREN, VA

Call Dan Hickman COLLECT at (703) 663-9251, or forward your resume to his attention at: CSC, Defense Systems Division, 38 Danube Drive, King George, VA 22485.

Working in conjunction with our Moorestown, NJ facility, opportunities are available for computer professionals with experience in any of the following:

- REAL-TIME SOFTWARE
- CMS-2
- OPERATING SYSTEMS

RED BANK, NJ

Call Rosemarie Celley COLLECT at (201) 747-6886, or forward your resume to her attention at: CSC, Defense Systems Division, 10 Highway 35, Red Bank, NJ 07701.

Participate in the design and development of advanced C^3 systems.

- ADA, PASCAL, PL/1, ALGOL
- TACTICAL C^3 SYSTEMS ENGINEERING
- MILITARY COMM NETWORKS
- SOFTWARE DESIGN & DEVELOPMENT

All candidates should have a BS degree in Computer Science, Electrical Engineering or a related discipline, and experience in any of the above areas. U.S. Citizenship is required.

Computer Professionals . . . Contact Arlene Sidney, Personnel Consultant immediately if you are attending the National Computer Conference the week of May 16th to schedule a confidential local interview.

Interviews will be held in the local Anaheim/Irvine area. Call TOLL-FREE 1-800-872-9287, Ext. 909.

If you are unable to call, mail resume or write: A. Sidney, Personnel Consultant, CSC, Defense Systems Division, P.O. Box N, Moorestown, NJ 08057.

CSC
COMPUTER SCIENCES CORPORATION

We are an equal opportunity employer. m/f/h/v.

1-2

Beehive offers unique proof.

Some companies choose Beehive International's unique TOPPER® terminal for network applications. Other specify it as a superior stand-alone. Either choice leaves both options open.

Some people prefer to work in a technologically-responsive small-company atmosphere, like Beehive's. Yet those who seek stability (14 years) and profitability ($40 million in sales) choose Beehive, too.

Then there's our location. We're in one of America's most sophisticated small cities, yet within each reach of almost every form of outdoor recreation you can think of.

Beehive International in Salt Lake City proves that paradox can be an opportunity. Send your resume with salary history, detailing your achievements in your chosen field, or give us a call Toll Free for more information. The results may prove satisfying in more ways than one.

Current Beehive opportunites exist for:

Manager Software Development

Manages software development group responsible for production of computer system software and applications. May coordinate software development with external organizations.

The successful candidate will have a minimum of three years experience in software management, including operating systems and communications. Knowledge of UNIX operating systems preferred.

Senior Programmer

For this position we require a minimum of three to five years experience and a BSCS degree or equivalent. Combined experience in UNIX or C, Ethernet, SNA, X.25, M68000 assembler language, firmware, hardware, diagnostic programming languages and DBMS is highly desirable.

Microprocessor Programmers

These senior level positions involve firmware and software development for all facets of this rapidly growing industry. These positions require experience with 68000 microprocessors, as well as a strong background in communications or terminals, 3-5 years experience with design code software for CRT based products. C-language and UNIX is desirable. Additional experience with firmware operating systems and terminal evaluation packages is strongly recommended. Positions require a BSEE or equivalent experience.

Beehive International
Personnel Department
P.O. Box 25668
Salt Lake City, Utah 84125
Telephone Toll Free: (800) 453-9454

BEEHIVE INTERNATIONAL®

Equal Opportunity Employer M/F/H/V

Programming

COMPUTER PROFESSIONALS

If you have a minimum of 2 years experience in computer programming, consider teaming up with **QUOTRON,** the first word in distributed information systems. See for yourself how you can grow with us as we produce a new and dynamic family of products.

- Systems Programmers
- Software Designers
- Programmer Analysts
- Database Designers
- Network Designers

We seek talented self-starters with vision to develop effective on-line office products and proven ability to engineer high-quality software in a multiprocessing environment.

Our financial information services include the opportunity for professionals to participate in the design and development of on-line systems which service the most prestigious national financial marketplaces. Positions require assembly language programming in communications, database and display applications in a multiprocessor configuration.

Our office automation products include openings for UNIX✲ Systems Programmers with a background in multiprocessor architectures, compiler implementation, intelligent controller firmware development, local area networks and X.25/SNA communications.

We offer a competitive starting salary, excellent company benefits package, and a congenial work environment in Marina del Rey. Please send resume or call:

(213) 827-4600

QUOTRON SYSTEMS, INC.

5454 Beethoven St.
P.O. Box 66914
Los Angeles, CA 90066-0914

✲UNIX is a trademark of Bell Labs.

Equal Opportunity Employer

SENIOR SYSTEMS ANALYSTS
SENIOR SOFTWARE ENGINEERS

The Space Telescope Science Institute has openings for several senior and intermediate level computer professionals. ST ScI, located at Johns Hopkins University in Baltimore, is a major international center for research in the field of astronomy. The Institute will be the site for scientific operations involving planning, scheduling, data acquisition and analysis for the Space Telescope, which is scheduled to be launched by the Space Shuttle in 1986. ST ScI is an academic research organization under contract to NASA.

Applicants must demonstrate a thorough knowledge of systematized approaches to large scale problem solving, software system development, and interactive data reduction techniques. Direct experience with real-time data acquisition, multi-processor or networked systems, image processing, or distributed database systems will be of interest. Successful candidates will possess, preferably, a Bachelor's degree in Computer Science, Physics or related field. We are seeking individuals who are able to work closely with scientists to develop flexible systems that meet their needs; but most importantly, applicants must have a true commitment to excellence. The successful candidates will have the unique opportunity to develop technically challenging systems in an atmosphere that provides the freedom to solve difficult problems in innovative and creative ways.

ST ScI offers an atmosphere of intellectual stimulation and reward, coupled with a competitive salary and benefits that includes 24 days paid vacation; employer paid pension, BC/BS, MM, and dental insurance; and relocation assistance.

Submit resume, salary history, and a portfolio of your work showing both program and design and documentation to: Steven Mantegna, Personnel Officer, Homewood Campus, Baltimore, MD 21218

SPACE TELESCOPE SCIENCE INSTITUTE

An Equal Opportunity/Affirmative Action Employer M/F/H

PROGRAMMER

Needed to convert symbolic statements of financial data and business problems to detailed logical flow charts for coding into computer language. Confer with personnel of organizational units involved to ascertain specific output requirements, such as types of breakout, degree of data summarization, and format for management reports. Specify in detail logical and mathematical operations to be performed by various equipment units and comprehensive computer programs, and operations to be performed by personnel in systems. Require a Bachelor of Science Degree in Computer Science or Systems Analysis with one year of experience in job being offered. Will consider additional academic coursework, ie Masters Degree in lieu of experience. Must be thoroughly knowledgeable in COBOL computer programming language. Must have thorough knowledge in accounting/financial concepts and their related programming applications. Must also have familiarity with banking principles. Forty hour work week. $1600 per month. Apply at the Arkansas Employment Security Division, P.O. Box 34047, Little Rock, AR 72203, (907) 371-2257. Ad paid by an Equal Opportunity Employer.

DIRECTOR OF INFORMATION SYSTEMS
MILWAUKEE PUBLIC SCHOOLS

Responsible for all Information System activities. Including application development and maintenance, operations, data administration, system and user training and data and word processing equipment services for a school system with 150 sites. The Director is responsible for a staff of 50 and a budget of $2 million. Requires Bachelor's Degree in Computer Science, Business Administration or Engineering and 3 years of significant managerial experience in data processing with emphasis on planning and directing information system activities. Salary range: $35-$49K, plus excellent benefits. SEND RESUME or call for application information: **Steve Smith, CITY OF MILWAUKEE PERSONNEL, BOX 095, Room 706, City Hall, 200 East Wells St., Milwaukee, WI 53202. (414) 278-2260.**

An Affirmative Action Employer

Computerworld

CLASSIFIEDS:

Our business is to help you improve ***yours–*** via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, etc....***AND ...***

...exposure to an audience of over half a million readers nationwide...

...every week.

Hardware & Software Professionals:

Parker Brothers Challenges You To Game Engineering

Parker Brothers has made a major corporate and engineering commitment to the future of video games and other electronic home game entertainment. We're shooting for a large share of 1983's anticipated market of 80-90 million video game cartridges. And our outstanding success in 1982 — capturing $115 million in sales with only 4 game cartridges — should tell you just how successful we plan to be. We now seek qualified engineers for the development of home entertainment products.

SOFTWARE

Project Manager
External Resources

A key management position, performing technical coordination and direction of external resources in the development of video game software. Position is responsible for overall management of outside contractors, providing technical guidance and support and ensuring that the outside work meets Parker Brothers' standards. The ideal candidate will have a BSEE/BSCS or equivalent, a minimum of 5 years' experience in microprocessor, real-time programming, and project management. Some travel required.

Project Manager
Video Software Development

Providing management and technical leadership, you will be responsible for the development of software implemented on a variety of home computers and video game systems. You will be responsible for managing several engineers in developing game software while acting as liaison between Marketing and Technical personnel to ensure timely completion of the best product possible. The ideal candidate should have a BSEE/BSCS or equivalent, a minimum of 5 years' experience in microprocessor real-time programming, and project management experience. Graphics, personal computer or game experience a plus.

Verification and Release Manager

You will manage the overall process of evaluating and qualifying new software products before release to manufacture. Responsibilities will include technical leadership and supervision of software engineers in the testing of the software products, ensuring product quality and integrity. You will be working closely with the Product Development team and Manufacturing in order to make our high volume operation run smoothly. The ideal candidate should have a BSEE/BSCE or equivalent. Experience in the Test Engineering area a plus. Microprocessor real-time programming background a must, as is a minimum of 2 years' management experience.

Project Manager
Preliminary Design Support

You will manage and provide technical leadership for a software support group. This group provides software support to inventors of video games and educational products, ensuring efficient implementation of game concepts. The ideal candidate will be a creative thinker, with BSEE/CS or equivalent, 2-4 years' management experience, and knowledge of both high level and assembly programming languages.

Sr. Software Engineers
Applied Technology / Video Game Development

We seek engineers with software experience in microprocessor-based products to work in all aspects of video game software and applied technology. You should have a BSEE/BSCS or equivalent with at least 3 years' experience in real-time assembly programming.

Sr. Software Engineer
Development Tools

You will be responsible for the design, implementation and debugging of microprocessor-based systems to be used in game design, mainframe communication, and remote software debugging. The ideal candidate will have a BSEE/BSCS or equivalent and both assembly and high level language experience. A familiarity with DEC processors and 8-bit microprocessors preferred.

HARDWARE

Project Manager
Electronic Systems

Responsible for technical coordination and direction in the development of Parker Brothers' new ventures into the home entertainment area, this Manager will be a senior technical contributor, and manage the overall process of developing products up to manufacturing. The ideal candidate will have a BSEE/MSEE and 5 years' minimum digital/microprocessor experience, including 2-4 years' management experience.

Sr. and Principal Engineers
Applied Technology

Responsible for identifying and applying new technologies to home entertainment. Duties include system design, analog and digital design, software, and applied research. The ideal candidate will have a BSEE and a minimum of 4 years' experience in digital microprocessor design. Knowledge of assembly language, high level language, RF, and integrated circuit design essential.

Sr. Product Support Engineer

This individual will act as liaison between Product Development and Manufacturing. Responsibilities will include re-design of existing electronic products, as well as technical analysis and problem-solving to make electronic hardware and software more reliable. You should have a BSEE or equivalent and 4 years' experience in test engineering and/or product support. Microprocessor experience preferred.

Sr. Engineer
Electronic Systems

In this position you will be responsible for overall hardware design of microprocessor-based video products. Duties will include system/subsystem design, hardware/software tradeoffs, documentation and testing. Candidate must have a BSEE, with a minimum of 4 years' experience in digital/microprocessor design. Assembly level programming and analog experience is essential; RF and video circuit design desirable.

Come To The Technical Career Job Fair!

TECHNICAL CAREER JOB FAIR ...the original

Come talk to our Technical Managers.

We will be at the Technical Career Job Fair at the Sheraton Anaheim, 1015 W. Ball Road on Monday, May 16 and Tuesday, May 17 from 11 AM to 9 PM. Drop in and find out about Parker Brothers' excellent compensation and benefits package and the exciting video game projects you'll be working on at Parker Brothers.

If you are unable to attend, please send your resume, in confidence, to Nancy Thibedeau, PARKER BROTHERS, Dept. CW 516, 50 Dunham Road, Beverly, MA 01915. Or phone (617) 927-7600. We are an equal opportunity employer M/F.

PARKER BROTHERS *Entertainment for the Future™*

SOFTWARE SUPPORT SPECIALISTS/TEAM LEADERS
(VAX/VMS, Networks, DECSYSTEM 20, TOPS-20)

IMPLEMENT ONE OF THE MOST SOPHISTICATED ENGINEERING COMPUTER CENTERS IN THE WORLD

If you're looking for a job that's perfect for your skills, there's a very good chance you'll find that job with Digital.

Because we're looking for highly talented, team-oriented software specialists who can help develop new operating systems functions for Digital's largest engineering computer center. A center that serves as a technical resource for Digital's large systems engineers and designers.

We'll provide you with virtually unlimited technical resources. Give you the chance to work with the next-generation computer products--in an environment that consists of multiple VAX/VMS systems connected via DECnet to several TOPS-20 and PDP-II systems. Assignments also offer exposure to such advanced concepts as ETHERNET, CI, COMMS and NETS, and distributed processing.

In short, you'll have the opportunity to build one of the most sophisticated computer centers in the world. And your success will bring all the personal and professional rewards you'd expect from a world leading computer company.

Write to us this week if you qualify.

TEAM LEADER (VAX/VMS)

Will have overall responsibility for operating systems and support of layered products for multiple VAX/VMS systems. Position will involve leading a team of support specialists whose primary goal is providing high performance/reliability for all installed VAX systems. Duties include planning new systems installation, implementing new operating systems and features, and system tuning. Position requires at least 5 years of operating systems support experience in an engineering or service bureau environment where the key objective is effective customer service. At least 2 years of VAX experience also required.

NETWORK MANAGER

Will lead a team of support specialists involved in providing a highly reliable network which delivers best achievable performance. Duties include topology planning, performance measurement/analysis, network troubleshooting, and interface with data center users to define new system implementation. Requires at least 5 years of experience with operating systems support and maintenance, preferable in an end user environment. Ideal candidate will have 2 or more years of DECNET experience in a VAX and DECSYSTEM 20 environment.

TEAM LEADER AND SOFTWARE SPECIALIST (DECSYSTEM 20/TOP-20)

Team leader will be responsible for providing high performance/reliability for all installed TOPS-20 systems.

Software Specialist will contribute to operating system/support of layered products for multiple DECSYSTEM 20/TOPS-20 systems.

Both candidates will be involved in planning new systems installations, operating systems and features, and conducting performance analysis and system tuning.

Positions require at least 2 years of operating systems support experience in an engineering or service bureau environment. At least 2 years of TOPS-20 experience also required. DECNET experience, team leader background or operational experience in either a VAX or TOPS-20 environment preferred.

To apply, please send your resume and salary history to:

Jerry West, Digital Equipment Corporation, Department 0516 3804, 200 Forest Street, Marlboro, MA 01752.

We are an affirmative action employer.

digital

TRAILBLAZERS WANTED.

GTE has embarked on an exciting journey into the future of information processing. We are developing and integrating network-deployed information systems to provide business and industry with complete voice, image and data communications capabilities.

Consequently, we need more of America's best thinkers: scientists, engineers, R&D specialists and others who are exceptional. People ready to join minds with other exceptional thinkers, already blazing trails into the future. People who relish high technical challenge. People who thrive on opportunities to think, imagine, create, innovate and lead.

Career opportunities exist for top individuals in the following areas:

- *Information Systems Architectural Design*
- *Distributed Data Base and DDP Technologies*
- *Data Base Management Systems*
- *Data Communications Networks*
- *Voice/Data/Image/Graphics*
- *Mathematical Modeling and Simulation*
- *Fourth Generation Data Processing Technologies*
- *Software Engineering*
- *Digital Communication Systems*
- *Office Systems*
- *Network Administration*
- *Project Leadership*

Individuals should possess a masters degree in Mathematics, Computer Sciences or Engineering and have significant experience in network-deployed information services.

We're looking for America's best thinkers and will compensate accordingly. Please direct your inquiry to Pam Avera, Staffing Administrator, GTE Data Services, Dept. D, P.O. Box 1548, DC 131, Tampa, Florida 33601. Or call toll free (800) 237-2774. *An Equal Opportunity Employer*

GTE Data Services GTE

The Jet Propulsion Laboratory Pasadena, CA.

Will conduct local interviews during
NATIONAL COMPUTER CONFERENCE
at the
GRAND HOTEL
#1 HOTEL WAY, CROWN II ROOM
ANAHEIM, CA.
MAY 16, 17, 18, 19, 1983
8:00 AM to 5:00 PM

Some interesting possibilities are:

- **IBM/MVS Systems Analyst/Programmer**
- **Univac 1100 Operating Systems Analyst**
- **IBM Computer Security Specialist**
- **Networking**
- **Computer Systems Engineers**
- **Artificial Intelligence**
- **Data Base Management**
- **Software - Ada Based Design**
- **Image Processing**
- **Computer Graphics**
- **Digital Cartography**

If you have an appropriate degree and background in one of the above areas, please call Greg Edwards at (213) 354-5155 prior to May 13, 1983 to arrange an interview during the Conference; or Call us at the hotel (714) 535-8252. If unable to meet with us May 16 - 19, please send a resume to:

Department J-58
JET PROPULSION LABORATORY
California Institute of Technology
4800 Oak Grove Drive
Pasadena, CA 91109

THERE'S ONLY ONE JPL

An Equal Opportunity Employer M F H V

DATA COMMUNICATIONS NETWORK OPERATIONS MANAGER

Our client, an excellent East Coast organization is seeking a strong leader who can get the job completed.

ENVIRONMENT: Packet-switching, SDLC, Bisynch, Distributed. Prefer SNA exp. with exposure to MSNF, NPDA, NCCF.

DEGREE IS A MUST.

This position offers an above average salary, excellent benefits, perks and relocation package.

Call Steve Immediately:
(714) 754-0198

Fortune

17744 Skypark Cir.
Irvine, Ca. 92714

SYSTEMS PROGRAMMERS

$25-50,000

Programmers/Analysts

Familiarity with any of the following:

- PL/M, PL/Z, PASCAL, UNIX/C or CP/M operating sys. 2-8 yrs exp. Degreed.
- Install & maintain UNIX, DEC & 3rd party software. Analyze & improve VAX performance
- Mathematical modeling, Software development
- Minis/Micros, Real Time controls
- Software Dev't. Exp in applications dev't utilizing UNIX/C
- Robotics & process machine control
- Write software graphic packages

This is a partial list of more than 1000 current openings listed with us. Fees & reloc expenses co pd. Call/Resumes to Dept C-8

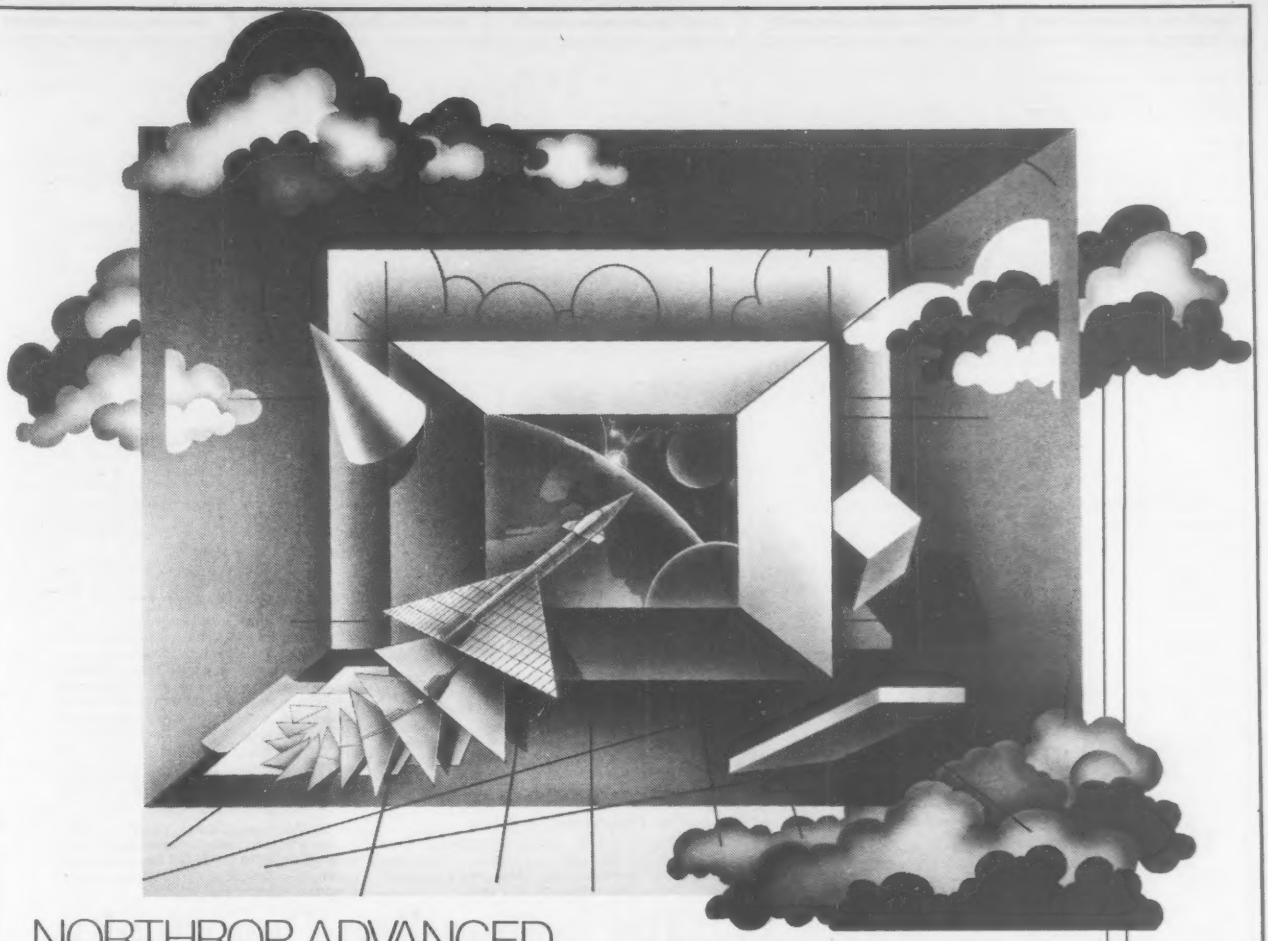
(609) 771-8282
J. ROGERS ASSOC
2999 Princeton Pike
Lawrenceville, NJ 08648

GIVE YOUR CAREER A SHOVE IN THE CLASSIFIED PAGES OF COMPUTERWORLD

Call 800-343-6474

(or 617-879-0700)

for more information



NORTHROP ADVANCED SYSTEMS DIVISION...

SHAPING THE THINGS TO COME

DATA PROCESSING PROFESSIONALS

The shape of things to come is ever changing . . . ever challenging at **Northrop.** Our computer professionals are directing their skills as far as the eye can see and beyond, designing and developing the future in aerospace. With the right amount of ability and dedication, you can participate side by side with some of the finest minds available to the aircraft industry. Examine the opportunities listed below, and apply your expertise to the shape of things to come.

Scientific Programmers
Numerical Analyst/Programmers
Scientific and CAD/CAM Systems
Numerical Control Systems Programmers
Requirements Planners
Sr. Scientific Programmer Analysts
Sr. CAD Scientific Programmer Analysts
CADAM Support Specialists
Sr. Postprocessor Support Programmers
Scientific Applications Programmer/Analysts
Data Base Administrators
APT/AC Systems Programmers
Scientific Data Processing Applications Specialists
Sr. Systems Support Programmers

(Contact: Kent Richey)

Sr. ILS Systems Analysts (Scientific)
Data Base Designer
Business Systems Analyst/Programmers
Computer Systems Technical Writer
Computer Science Instructor

(Contact: Barbara Nettles)

Northrop Advanced Systems professionals benefit from an excellent working environment in **Northrop's** newest facility located in Pico Rivera, and an ideal Southern California life style that offers recreational, educational and cultural advantages. In addition, we provide our professionals with a level of compensation and comprehensive benefits that you'd expect from an aerospace leader. If you're a Data Processing professional who wants to play a role in shaping the things to come, send your resume and salary history to the contact person listed under your specialty.

Employment Office • Dept. 646
P.O. Box 1138 • Pico Rivera, CA 90660-9977

U.S. CITIZENSHIP REQUIRED
Equal Opportunity Employer M/F/H

NORTHROP

Making Advanced Technology Work

OTHERS WILL FOLLOW

position announcements | position announcements | position announcements | position announcements | position announcements

Match your high performance hardware with high performance "peopleware."

If you, and your users, are frustrated by DP staff vacancies, call us today! We'll find, screen and help you hire the professionals to do the job you want done.

Call our DP specialist listed in your area:

ALABAMA
Huntsville 205/539-2244
Mobile 205/479-6566
Tuscaloosa 205/345-0120

ARIZONA
Scottsdale 602/941-1515

ARKANSAS
Little Rock 501/661-1650

CALIFORNIA
Burlingame 415/692-8500
Laguna Hills 714/768-9112
Los Angeles (Encino) 213/906-3155
Menlo Park 415/328-8024
Newport Beach 714/553-0311
Oakland 415/452-0140
San Diego 619/299-4940
San Francisco 415/981-5950
Santa Barbara 805/683-1451
Santa Rosa 707/526-9500

COLORADO
Boulder 303/447-9900
Colorado Springs 303/471-3620
Denver 303/758-8585

CONNECTICUT
Hamden 203/248-0770
Hartford 203/528-4434
Stamford 203/324-2232

FLORIDA
Bradenton 813/792-2568
Clearwater 813/796-1972
Jacksonville 904/356-8513
Lakeland 813/665-8077
Miami (Coral Gables) 305/448-1608
Miami (North) 305/576-5260
Pensacola 904/476-1703
St. Petersburg 813/577-2116
Sarasota 813/923-3671

GEORGIA
Atlanta 404/455-4132
Atlanta (North) 404/998-1555
Atlanta (Northwest) 404/955-2785
Augusta 404/736-3327

IDAHO
Boise 208/336-6770

ILLINOIS
Barrington Hills 312/639-1112
Bloomington 309/828-3317
Chicago (Downtown) 312/648-1800
Springfield 217/753-3100

INDIANA
Fort Wayne 219/432-3500
Indianapolis 317/257-4261
Richmond 317/935-3356
South Bend 219/233-9353

IOWA
Cedar Rapids 319/366-8441
Mason City 515/424-1680
Quad Cities (Bettendorf) 319/359-3503
Waterloo-Cedar Falls 319/236-1510

KANSAS
Overland Park 913/648-1703
Topeka 913/233-6419
Wichita 316/681-3330

KENTUCKY
Lexington 606/269-8865
Louisville 502/456-4330

LOUISIANA
New Orleans 504/581-3655
Shreveport 318/688-4100

MARYLAND
Annapolis 301/841-6600
Baltimore (Towson) 301/823-9010
Columbia 301/995-1040
Frederick 301/663-0600
Laurel 301/953-7000

MASSACHUSETTS
Boston 617/262-5050

MICHIGAN
Ann Arbor 313/769-1720
Birmingham 313/647-2828
Dearborn 313/336-6650
Grand Rapids 616/534-7211
Kalamazoo/Portage 616/381-1153
Rochester 313/652-6800
Saginaw 517/790-5900
St. Joseph 616/429-6555

MISSISSIPPI
Central Mississippi 601/969-5523

MISSOURI
Kansas City 816/221-2377
St. Louis (Airport) 314/731-6800
St. Louis (Downtown) 314/241-5866

NEBRASKA
Omaha 402/397-8115

NEVADA
Las Vegas 702/737-3909
Reno 702/826-5243

NEW JERSEY
Bergen County 201/445-9600
Cherry Hill 609/662-2660
Monmouth County 201/747-2400
Morris Plains 201/538-8800
Princeton 609/452-7711
Sussex County 201/691-2000

NEW MEXICO
Albuquerque 505/298-8151

NEW YORK
Buffalo 716/852-5520
Manhattan-57th Street 212/765-1802
Rochester 716/325-1660
Rockland 914/735-7015
Syracuse 315/471-7161
Woodbury 516/364-9290

NORTH CAROLINA
Burlington 919/229-5381
Charlotte 704/527-6800
Kinston 919/527-9191
Raleigh 919/781-0400

OHIO
Akron 216/867-2900
(Cleveland) 216/621-7387
Canton 216/497-0122
Cincinnati 513/651-5500
Cincinnati (Northwest) 513/851-6661
Cleveland (Downtown) 216/623-0022
Cleveland (North) 216/261-7696
Columbus 614/436-3200
Dayton 513/228-8271
Lorain/Elyria 216/236-3921
Toledo 419/865-6044
Washington Court House 614/335-8744
Youngstown 216/788-4037

OKLAHOMA
Tulsa 918/622-6632

OREGON
Portland 503/287-8701

PENNSYLVANIA
King of Prussia 215/964-1200
Lancaster 717/299-2811
McMurray 412/941-1340
Philadelphia 215/665-9430
Bucks County (Phila. area) 215/757-1543
Pittsburgh (South Hills) 412/922-5200
Reading 215/372-4756
Willow Grove 215/657-6250

SOUTH CAROLINA
Greenville 803/235-8581
Myrtle Beach 803/448-1761
Rock Hill 803/324-5181
Spartanburg 803/573-7427

TENNESSEE
Chattanooga 615/870-2148
Knoxville 615/690-6031
Memphis 901/794-3130
Nashville 615/377-1130

TEXAS
Amarillo 806/353-9549
Arlington (Ft. Worth) 817/469-6161
Beaumont 713/866-0303
Bryan/College Station 713/693-2200
Dallas 214/934-9503
Dallas (Highland Park) 214/521-8810
El Passo 915/778-9411
San Antonio 512/826-8666

UTAH
Salt Lake City 801/364-5700

VIRGINIA
Lynchburg 804/528-1611
Newport News 804/599-5929
Richmond 804/285-2071

WASHINGTON
Seattle 206/328-0936
Seattle-North (Lynnwood) 206/775-0661

WISCONSIN
Appleton 414/731-5221
Green Bay 414/437-4353
Milwaukee 414/273-4430
Racine 414/886-1810
Wausau 715/842-2212

WYOMING
Cheyenne 307/635-8731

CompuSearch® A Division of Management Recruiters®
MANAGEMENT RECRUITERS®

Understanding your DP needs is our first concern!

Why do the best Computer Professionals choose Ford Aerospace?

One reason is the opportunity to have impact in a totally supportive environment.

We offer key opportunities for computer professionals to design and develop hardware and software systems, new applications and communication protocols. All positions listed require an **appropriate degree** and directly related experience.

Sr. Electrical Engineer
Microcomputer systems analyst to develop hardware and software for microprocessors and peripherals such as CRTs and Printers, with the ability to understand circuit design, computer architectures and development of interface hardware.

Compiler Writer
Design structured software development tools and methodologies and have experience in writing high order language compilers. MS in Computer Science is desired and some experience with VAX 11/780.

Sr. Data Base Analyst
Develop Corporate Logical Data Plan and each system's logical and physical data views. Candidates must have a minimum of three to five years experience in the areas of Data Dictionary usage, top down design, user view synthesis, entity analysis and normalized and logical data base design. Excellent written and verbal communication skills are mandatory in this position.

Sr. Programmer/Analyst
Project Leader to develop and implement major manufacturing and materiel systems. Candidates must have directly related programming experience and excellent communication skills.

Data Communications Engineer
Assist with the development of Divisional network systems plan; design and install data communications networks. Position requires a technical degree and experience with communication hardware and protocols; familiarity with ISO and ANSI standards, including X.25 and knowledge of SNA, DECNET and PRIMENET systems/protocols including SDLC and DDCMP.

Systems Managers/Programmers
Multiple projects provide an extremely dynamic and diversified environment for systems managers/programmers. All positions require an appropriate degree and directly related systems programming experience. Computer Systems: VAX 11/780 (VMS), Honeywell DPS 8/70 (GECOS), IBM 3033/4341 (MVS), PRIME 559/750 (PRIMOS).

Software Specialist — IBM Business Systems
Analyze and resolve significant IBM operating systems problems; develop system related proposals, including relevant cost; design totally new system applications and provide technical support to Data Management. An appropriate degree and a minimum of five years experience in the development, implementation, and programming of operating and communications software is essential.

Ford Aerospace offers long-term project stability and a comprehensive benefit package — including relocation assistance.

For immediate consideration, please send your resume to: **Marsha Bridges, Professional Placement, Dept. A880-002, Ford Road, Newport Beach, CA 92660, or call collect (714) 720-5869.**

The bottom line. Opportunity.

Ford

Ford Aerospace & Communications Corp.
Aeronutronic Division

U.S. Citizenship Required/An Affirmative Action Employer

PROJECT LEADERS
— and —
PROGRAMMERS/ ANALYSTS
Florida Oppty!

AUXTON COMPUTER ENTERPRISES, Inc., is a management consulting organization specializing in the development of business applications software for the communications industry.

We are presently expanding our technical staff and have a need for experienced data processing personnel with the following background:

*** Project Leaders**
Candidates must possess solid leadership experience with technical background in PL/1, "C" language, FOCUS, or COBOL.

*** FOCUS**
Experienced with FOCUS and/or other User friendly databases (i.e. RAMIS).

*** IMS DB/DC**
Solid working experience designing DB/DC base systems. Candidates should be familiar with PL/1, in an IMS database environment.

*** CICS**
Individuals must possess 2-5 years experience in programming on-line systems in COBOL. Model 204 experience highly desirable.

*** "C"**
Experienced with "C" language running under * UNIX operating systems.

We offer selected applicants competitive starting salaries, and comprehensive benefits. For consideration, send resume stating salary history and requirements to:

JAN ACKERMAN
AUXCO
Auxton Computer Enterprises, Inc.
201 East Pine St., Suite 210
Orlando, Florida 32801

* UNIX is a trademark of Bell Laboratories
an equal opportunity employer

SYSTEMS ANALYST/PROGRAMMER
AT LOS ALAMOS NATIONAL LABORATORY

The Los Alamos National Laboratory offers a challenging and diverse career opportunity for an individual with demonstrated professional expertise in the area of IBM computer operating system security. The position requires a thorough understanding of and familiarity with the IBM OS/VM, OS/VS-1, and MFT operating systems as well as JCL, ALC, and FORTRAN languages running on IBM 370 hardware. The position requires the ability to design, test, and implement operating system security software for non-standard IBM operating systems.

The educational requisites for this position specify a Bachelor's or higher level degree in computer science or related field or an equivalent combination of education and experience in the field of Systems Analysis, Programming or Computer Science.

The Los Alamos National Laboratory is operated by the University of California for the Department of Energy. The Laboratory is located in the mountains of northern-central New Mexico at an elevation of 7200 feet. The living is uncrowded, casual; the environment is pollution free. The sunny climate is superb; cool summers and mild winters. Los Alamos has an excellent school system. Recreational opportunities abound including hiking, camping, fishing, skiing, tennis, etc. The Laboratory offers a competitive salary structure and an excellent fringe benefits package including 24 days annual vacation.

To apply, send resume in confidence to:

Elmer Salazar
Associate Group Leader, DIV 83-P
Personnel Administration Division, MS P206
Los Alamos National Laboratory
Los Alamos, NM 87545

University of California
Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

An Affirmative Action/Equal Opportunity Employer Women, Minorities, Handicapped, and Veterans are urged to apply. Citizenship is required.

The Dawn Of A New Era In Information...

Be A Part Of It With American Bell.

American Bell, a new AT&T Company, will provide sophisticated information handling and management services for clients across America. We can offer data professionals the resources and freedom to develop entirely new systems and software in a new era in information.

THE AMERICAN BELL ENVIRONMENT

Our Hardware includes IBM 308X, IBM 3705, COMTEN 3690, and AMDAHL 5860. Data Base Management Systems cover CICS/VS, IMS/VS, MODEL 204, FOCUS, ADABAS, and DMS 1100. Software is written using COBOL, PL/1, FORTRAN, C and SHELL. The Operating Environment consists of MVS/JES, VTAM/NCP, VM/SP, UNIX*, TSO/SPF and OS 1100.

AMERICAN BELL is seeking over 200 qualified,experienced individuals. If you have the appropriate experience in one or more of the categories listed below, you may be the person we are looking for.

DATA COMMUNICATIONS:

Two or more years experience is required.

NETWORK CONTROL CENTER, line monitoring, modems, protocols (X.25, 3270 BSC, SDLC/HDLC), front end processors and IMS/CICS MTO.

PLANNING AND DEVELOPING corporate data communications network, X.25 and packet switching, programming data communication interfaces and host access methods.

DESIGN AND ANALYSIS of network, modify and maintain network tools, programming experience in PL/1 or COBOL.

INSTALLATION, TESTING, AND MODIFICATION of communication software, VTM, EP, NCP using TSO/SPF.

COMPONENT EVALUATION (including mini computer, microcomputers and office automation equipment) with regard to interfaces and support.

IDENTIFYING DATA COMMUNICATION NEEDS for new data centers, defining configurations and providing information to procurement groups.

SYSTEMS PROGRAMMING:

Two or more years experience is required.

SOFTWARE SUPPORT for IMS, MVS/SP, VM/SP, OS 1100 and UNIX*, maintenance and installation, on line performance and problem diagnosis, installation migration planning and documentation.

DATA CENTER SUPPORT for MVS/SP, VM/SP, OS 1100, UNIX* and IMS, coordination and migration of sysgens and installation of FDP/IUP's.

IMS DATA BASE SUPPORT, administration and planning, data dictionary, ADF and back-up and recovery.

CICS, MODEL 204, ADABAS support, CICS problem determination, performance tuning, command language programming and user interface. MODEL 204 sysgens and problem determination. ADABAS and NATURAL, complete sysgens and problem determination.

APPLICATION SUPPORT, IMS, CICS and ADABAS.

INSTALLATION AND MAINTENANCE of vendor program products support for system control program (release and fix levels) such as FOCUS, SAS EMPIRE, DMS 1100, QLP 1100, MICS, SYNCSORT, UCC7, UCC1, UCC8, COBOL and PL/1.

SOFTWARE STUDIES, HARDWARE PLANNING, capacity planning and measurement and tuning.

PERFORMANCE ANALYSIS, data collection, analysis and tuning in a multi-main frame environment.

DASD MANAGEMENT, space allocation, and monitoring, configuration and HSM support.

DEVELOPMENT OF PRODUCTIVITY AIDS, CLISTS, SAS, GRAPHICS

DEVELOPMENT AND ADMINISTRATION of RACF, standards and documentation.

CAPACITY PLANNING:

CAPACITY PLANNING, application sizing, mini and main frame sizing, application workload balancing, configuration layout. Detailed knowledge of MVS/IMS or VM/CMS, minimum of one year experience with one or more of the following; BEST/1, CRYSTAL, SNAP/SHOT, SAS or MICS.

TRAINING:

TECHNICAL TRAINERS are needed for each of the following disciplines. Two years experience is required. PL/1 • Communications • CICS/VS • BASIC Language and use of mini/micro computers • Computer Subsystem Design or Personnel Subsystem Design. Individuals will provide formal classroom instruction, develop educational materials, interface with users and vendors and must have effective oral and written communication capability.

ADVANCED OFFICE SYSTEMS TRAINERS with one year experience in one or more of the following; UNIX* and Office Automation systems, course development and delivery, in addition to word processing and/or office automation experience.

COMPUTER OPERATIONS & TECHNICAL SUPPORT:

Two or more years experience is required.

ABEND RESOLUTION, restart and system recovery, JCL analysis and job set-up.

DATA BASE MAINTENANCE and recovery, monitoring and tuning with CICS, IMS and MODEL 204.

SUPERVISE VM OPERATIONS and processing commitments, console operations, tape library and training new operators.

SUPERVISE MVS OPERATIONS and processing commitments, console operations, tape library and training new operators.

COMPUTER CONSOLE OPERATIONS, operation of system hardware, retention of logs and file maintenance.

Positions are available in Orlando at all levels. All require an appropriate degree or equivalent experience and permanent residency. We can offer competitive salaries, comprehensive benefits (relocation assistance is available) and excellent potential for professional advancement. For confidential consideration, please submit resume to: Mr. W.P. Kroll, District Manager, Dept. 130, AMERICAN BELL, INC., P.O. Box 13970, Orlando, Florida 32859. (We regret that we cannot accept phone calls or pay agency fees.)

An Equal Opportunity Employer

American Bell

An AT&T Company

*Trademark of Bell Laboratories

Systems Engineers
Applications Consultants

Discover the Solution

At Cullinet, innovative products and unyielding support have contributed to our being rated #1 by an enthusiastic user base. On April 19, 1983, the major product announcements of four revolutionary software solutions made it possible to implement a workable, company-wide computer strategy. With the advent of these breakthroughs, Cullinet clearly established its leadership in the software age. There is no better time or place to realize your true potential.

To qualify for these positions, you must have experience in a large scale IBM environment, with specific expertise in one of the following: Operating Systems, Assembler, or COBOL and Applications-specific experience (financial or manufacturing). On-line and database experience required, and excellent communication skills essential. Beyond that, we want problem solvers who excel at interaction with customers and peers, people who welcome the challenge of exposure to every Cullinet product.

To explore these opportunities, please send your resume to C.H. Levy, Department CW-516, Cullinet, 400 Blue Hill Drive, Westwood, MA 02090.

An Equal Opportunity Employer

Cullinet

The solution is software . . . and software is Cullinet

COMPUTER PROFESSIONALS

program your future with

anatec

and earn up to $40,000/year!

At ANATEC, we're expanding our data processing team with Programmer/Analysts experienced with IMS DB/DC and/or CICS on Large Scale IBM Mainframes. We're also seeking Information Center Specialists and Data Base Administrators.

You'll work with Fortune 500 clients in the areas of robotics, business, manufacturing, finance and government. You can choose your assignments and expand your skills on state-of-the-art IBM equipment. You can work towards upward mobility on a well-defined career path in all areas of data processing.

And we'll provide you with a top salary — up to $40,000/year depending upon experience — along with generous fringes like major medical, dental, optical, life and disability insurance, overtime pay, paid vacation, tuition reimbursement for courses leading to a degree and more.

If you're interested in achieving real career growth and the satisfaction that comes with it, please don't delay...

CALL TODAY, (313) 540-4440

or if your resume needs updating, just return the attached coupon...

NAME _____

ADDRESS _____

PHONE _____

SOFTWARE LANGUAGE EXPERIENCE: _____

ANATEC, Analytical Technologies, Inc.
30300 Telegraph, Suite 184 • Birmingham, MI 48010

No agencies please; a special $$$ bonus will be given to those hired through direct response.

Independent Contractors also welcomed.

We are an Equal Opportunity Employer

anatec

Succeeding With Imagination

Programmers & Programmer Analysts

The United Nations Development Programme administers one of the world's largest multilateral funds for technical assistance to developing countries. Challenging opportunities exist for qualified programmers and programmer/analysts in the Division of Management Information Services to participate in the development of information systems in a wide range of application areas. A number of assignments of varying duration are currently available at the New York headquarters of UNDP.

Individuals selected for this programme must have the ability to work well within teams developing complex on-line systems. Languages presently used are COBOL/CICS, MARK IV, PL/1 and INQUIRE. A minimum of 5 years programming experience in one or more of the above languages as well as a university degree are required.

These positions offer an excellent compensation package. Visa and relocation assistance will be offered where applicable. Only qualified applicants will be reviewed. For consideration, please submit a detailed resumé to:

Director of Personnel
UNITED NATIONS DEVELOPMENT PROGRAMME
One United Nations Plaza
Room DC-1818, Dept. C
New York, NY 10017 USA

UNITED NATIONS DEVELOPMENT PROGRAMME

University of Alaska, Juneau: Computer Information faculty position (CIS). Master's or CDP Certificate in Data Processing required, Doctorate preferred. Emphasis/experience in Computer Information Systems. Ability to teach upper division courses offered in the BBA/CIS degree program. Desire teaching potential and/or experience in academic program development and substantial business, government or consulting experience. Salary: $3,106 to $4,551 per month; faculty rank and salary dependent upon qualifications. Continutation of position dependent on funding after first year. Closing date May 20, 1983; may be extended. Beginning date as soon as possible after closing; no later than August 22, 1983. Letter of application, current resume, transcripts and recent letters of recommendation from three references should be sent to:

Robbie Stell, Dean
School of Business
1108 F Street
Juneau, AK 99801

THE UNIVERSITY OF ALASKA IS AN EEO/AA EMPLOYER AND EDUCATIONAL INSTITUTION

HIRE
A
HOT SHOT
IN THE
CLASSIFIED
PAGES
OF
COMPUTERWORLD

Our 5¼" Winchester technology disk drive.

Meet The New Kid On The High-Tech Block...

We're MiniScribe Corporation of Longmont, Colorado. The phenomenal success of our 5¼" Winchester technology disk drives in the OEM desktop computer market has led to our development into one of the 10 fastest growing companies in the United States.

But we won't rest on our laurels. We plan to forge ahead with aggressive research and development of new products designed to capture more of the market. Our bright future means that we will be able to offer career excitement that many other companies no longer can.

Our current expansion allows us to offer professional positions in the following disciplines:

- **Design Engineering**
- **Production Management**
- **Materials Management**
- **Quality Engineering**
- **Manufacturing Engineering**

If you fit our qualifications, we'll meet yours with competitive salary, incentive stock options... and more. Recapture the excitement of working on new, innovative projects. Rediscover exhilarating career growth in a fast-paced, high output environment.

Send your resumé and salary history in time to enjoy springtime in the Rockies, right in our backyard.

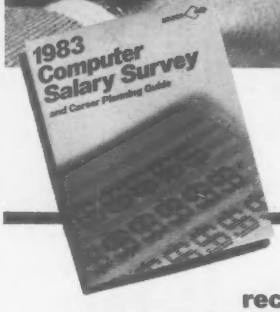
MiniScribe

Human Resources Department, Dept. CW 5/16
410 South Sunset Dr., Longmont, Colorado 80501

An Equal Opportunity Employer M/F

MiniScribe puts your career on the cutting edge of technology.

Somehow, Did Your Last Raise Seem Insignificant?



New, Free Computer Salary Survey!

Learn about compensation in the computer field, including the effects of inflation and recession, and which career paths offer the greatest compensation from a 28-page report prepared by Source Edp.

Despite past inflation and recession, demand for computer systems and the people needed to support them continues to grow.

But which professionals, with what specialized experience and skills, are really in the best positions for long term career and salary growth? And is your salary really keeping pace?

In our new Survey, you'll get answers to these questions and much more.

Compare your salary with many others.

The new Survey not only provides salary medians for 48 position categories, but it also shows "highs" and "lows" for each one as well. Figures are organized by types of professionals, including those ranging from commercial programmers to management and marketing positions; by experience level and by size of computer installation site.

So you'll be able to compare your salary with those computer professionals who have similar responsibilities and skills and to learn who in computing, in what kinds of specialized disciplines, are earning the most.

No other Survey we know of is more comprehensive. It's based on contacts with more than 50,000 professionals and 25,000 organizations.

Learn about new growth areas.

Most significantly, you'll also read about which specific areas of specialization are forecasted for unusual growth in this decade and beyond. The past year saw many changes in the economy and has altered career prospects for some professionals who were not properly prepared, so the need to stay abreast of current trends and career planning has never been so critical.

Whatever computer specialty you're in, or plan to explore—programming, software, systems design, data communications, mini/micro systems, data base, computer marketing, sales, management or others—our Survey can help you make the most of your career. You'll be able to keep up with changes in the profession, establish career goals, develop action plans, evaluate your progress, spot potential dangers, take corrective action when needed, and in general, keep your career on the best possible course for growth.

Call for your free copy.

The new *1983 Computer Salary Survey and Career Planning Guide* is available without charge. You owe it to yourself to get a copy of the report—especially if most of your career lies ahead of you.

Call today and our free 28-page Survey will be mailed to you in strict confidence, without obligation.

source edp
Personnel Services.

The world's largest recruitment firm that specializes exclusively in the computer profession.

Client companies assume our charges.

Call today.

Call the office nearest you that is listed to the right. If unable to call, write:

Source EDP, Dept. CS-10
P.O. Box 7100
Mountain View, CA 94039

(When writing, please indicate your title.)

Call today.

United States:

Arizona
Phoenix [illegible]

California
(Northern) Mountain View [illegible]
San Francisco 415/434-2410
Walnut Creek 415/945-1910
(Southern) Century City 213/203-8111
Fullerton 714/871-6500
Los Angeles 213/988-0041
Newport Beach 714/833-1730
San Diego 619/231-1900
Torrance 213/540-7500
Van Nuys [illegible]

Colorado
Denver [illegible]

Connecticut
Hartford 203/522-6590
Stratford 203/375-7240

District of Columbia
Washington D.C. 202/466-5890

Florida
Miami 305/624-3536

Georgia
Atlanta (Downtown) [illegible]
Atlanta (North) 404/953-0200

Illinois
Chicago (West Loop) 312/782-0857
Oak Brook 312/986-0422
Rolling Meadows 312/392-0244

Indiana
Indianapolis 317/631-2900

Kansas
Overland Park 913/888-8885

Kentucky
Louisville 502/581-9900

Louisiana
New Orleans 504/561-6000

Maryland
Baltimore [illegible]
Greenbelt [illegible]
Towson 301/321-7044

Massachusetts
Boston 617/482-7613
Burlington 617/273-5160
Wellesley 617/237-3120

Michigan
Detroit 313/259-7807
Southfield 313/352-6520
Troy [illegible]

Minnesota
Minneapolis (Downtown) [illegible]
Minneapolis (West) 612/544-3600
St. Paul 612/227-6100

Missouri
Clayton 314/862-3800
Kansas City 816/474-3393

New Hampshire
Nashua 603/880-4047

New Jersey
Cherry Hill 609/482-2600
Edison 201/494-2800
Morristown 201/267-3222
Paramus 201/845-3900
Princeton 609/452-7277

New York
New York City
(Grand Central) 212/557-8611
(Penn Station) 212/736-7445
(Wall Street) 212/962-8000
Rochester 716/263-2670
Syosset, L.I. 516/364-0900
White Plains 914/683-9300

Ohio
Akron 216/535-1150
Cincinnati 513/769-5080
Cleveland 216/771-2070
Columbus 614/224-0880
Dayton 513/461-4660

Oklahoma
Tulsa 918/599-7700

Oregon
Portland 503/223-6180

Pennsylvania
King of Prussia 215/265-7250
Philadelphia 215/665-1717
Pittsburgh 412/261-6540

Texas
Dallas (Central) 214/954-1100
Dallas (North) 214/387-1600
Fort Worth 817/338-9300
Houston (Downtown) 713/751-0100
Houston (W. Loop South) 713/439-0550
San Antonio 512/342-9898

Virginia
McLean 703/790-5810

Washington
Bellevue 206/454-6400

Wisconsin
Milwaukee 414/277-0345

Canada:

Ontario
Toronto
Downtown 416/865-1125
Don Mills 416/425-5730
Mississauga [illegible]

UNIVERSITY OF VERMONT
DEC SYSTEMS PROGRAMMER

The Academic Computing Center requires a systems programmer to help maintain a DEC 2060 system running under TOPS-20. Responsibilities include maintenance of the operating system, system utilities and languages. Some experience with telecommunications and networking is also needed. Master's Degree in computer science or related field, two years of FORTRAN, and 3 to 4 years of TOPS-10/20 experience are required. Excellent fringe benefits package, friendly academic atmosphere, and an agreeable living environment in the Burlington area. Please submit a resume with cover letter along with the names of 3 professional references. **For further information contact Personnel Department, Waterman Building, University of Vermont, Burlington, Vermont 05405.**

An Affirmative Action Employer

Programmers

PART-TIME CONTRACTS AVAILABLE

Local part-time contracts are available **right now!** For more information write:

Sunbelt Publications
484 Lake Park Ave. Suite 147
Oakland, CA. 94610

CAREER OPPORTUNITIES FOR SOFTWARE PROFESSIONALS

COME GROW WITH GAI

GALLER ASSOCIATES, INC. (GAI), is a twelve year old international consulting and software development firm. We are seeking career-minded ADP professionals with 2 or more years experience for challenging technical assignments and career growth opportunities. We offer excellent salaries and fringe benefits. We have openings in Arizona, California, Texas and the Washington, DC metropolitan area for:

SYSTEMS PROGRAMMERS

- **IBM 370, 30XX, 4341: OS/MFT and/or OS/MVS; FORTRAN helpful**
- **HONEYWELL 6000, 66, DPS-8: GCOS-III and/or GCOS-8; GMAP**

APPLICATIONS PROGRAMMERS/ANALYSTS

- **IBM 370, 30XX, 4341: COBOL, CMS and TOTAL and/or INQUIRE**
- **HONEYWELL 6000, 66, DPS-8: COBOL, DM-IV/TP, IDS-I/II or TPE**

If you have the skills and the desire to join a solid, growing company, call now, or send your resume and salary history to:

GALLER ASSOCIATES, INC.
1000 Wilson Blvd., Suite 2105
Arlington, VA 22209
(703) 525-9292
Attn: B. Kesner

PRINCIPALS ONLY EOE

IDMS PROFESSIONALS

We are a young and fast growing California 100 company headquartered in the San Francisco Bay Area. We have recently installed IDMS in conjunction with CICS. We have three major development projects about to begin. All will use IDMS and CICS. We have staffing requirements of two Project Leaders, three Analyst/Programmers, and a Data Base Analyst for these projects. Relocation assistance is available.

Forward your resume in confidence to:

Reply to CW-B4153
Computerworld
Box 880
Framingham, MA 01701

University of South Dakota
Computer Science Faculty Position

The Computer Science Program is accepting applications for 2 faculty positions for fall 1983 to teach graduate and undergraduate courses plus participate in the development of a new MA program. Master's Degree in Computer Science minimum, Ph.D. preferred. Salary competitive. Send resume, graduate transcripts, and three letters of reference to: **Dr. Vern Ellingstad, Computer Science, University of South Dakota, Vermillion, SD 57069.**

DATA PROCESSING OPPORTUNITIES

MID-CONTINENT COMPUTER SERVICES, INC., is a state-of-the-art data processing firm (DEC, IBM, TANDEM, Burroughs) which provides services to savings and loan institutions throughout the western United States. We are expanding our services and are in need of results-oriented professionals to assist us in the following positions:

PROGRAMMER ANALYSTS— CONVERSIONS

- Analyze the data structure of new customers.
- Write, test and debug a set of custom programs to convert the data.
- Requires 2-4 years COBOL experience.
- Banking and/or savings and loan applications preferred.
- May involve frequent travel.

PROGRAMMER ANALYSTS — FINANCIAL APPLICATIONS

- Analyze & define systems requirements to develop new programs and enhance or modify existing programs.
- Requires 2-4 years COBOL experience.
- Burroughs medium systems desirable.
- Banking and/or savings and loan applications preferred.

SYSTEMS SUPPORT MANAGER

- Direct and coordinate all functions associated with vendor supplied operating systems.
- Provide guidance and resource for Burroughs, TANDEM, Digital operating systems and data communication functions.
- Manage and direct activities of programming staff.
- 4+ years technical management experience.
- 3-5 years technical background on Burroughs medium systems.
- TANDEM, Digital operating systems and/or data communications experience preferred.
- BS degree in C.S. or E.E.

We offer an excellent compensation and benefit package which includes health, life and dental insurance; profit sharing; vacation; holidays; bonus days; and working environment. Interested candidates should send a resume or application to:

MID-CONTINENT COMPUTER SERVICES, INC.
Attn: Personnel
5850 DTC Parkway; Bldg. 14
Englewood, CO 80110

NO AGENCIES
An Equal Opportunity Employer M/F

Take the shuffle out of the search.

Find the old articles you need to refer to in the Computerworld Index.

[For details, call or write our Circulation Department]

COMPUTER SALES PROFESSIONAL

San Francisco Bay Area

Xerox Electro-Optical Systems has an outstanding opportunity for a professional Computer Sales Representative to enter a rapidly expanding area in the high technology industry.

We are a leading manufacturer of workstations for exploratory programming development. As a key member of our staff, you will be responsible for sales to universities, government and industrial organizations involved in artificial intelligence and expert system research.

Qualified individuals should possess the following:

- Four or more years proven track record selling small/medium scale computers and software systems.
- Knowledge of computer systems selling.
- Knowledge of the research market.
- BS degree in a technical discipline or equivalent technical experience.
- Willingness to travel extensively.

We offer excellent salary and benefits, plus profit sharing, in a highly visible, professional environment.

If you meet our qualifications, please send your resume including salary history to:

Employment Manager-Dept. NC

XEROX
Electro-Optical Systems
300 N. Halstead St.
Pasadena, CA 91107

Principals only, please

u.s. citizenship required..an affirmative action employer

IDMS Professionals

If you have applications software development experience using Cullinana's Integrated Data Base Management System (IDMS), come claim the substantial career rewards waiting for you at Hughes Aircraft Company in the Los Angeles area, world leader in electronics and data systems.

WANTED: Programmers, Programmer-Analysts, System Analysts, DP Analysts, DB Administrators, and Data Communication Administrators with experience using IDMS and such associated facilities as OLQ, CULPRIT, and the IDD. These individuals will work with information modeling, conceptual scheme techniques, prototype development, dictionary-driven development, ADS-O, OLE, and on-line IDD.

Project Engineer

One or more skilled individuals for positions at Project Engineer level or higher, with system experience (system engineering, integration, design, or test)...

To join a System Engineering organization responsible both for system engineering in an Information Systems organization and for DP architecture planning, monitoring, and reporting throughout our Hughes operating group.

The engineering position offers considerable responsibility in a highly interactive environment. Desired experience and knowledge in order of preference includes: IBM System Hardware and Software, software system engineering, long-range information system planning, LAN and data communication, data base management systems, planning and evaluation of training, microprocessors, software development, or multivendor hardware.

Hughes is a team of 60,000 hardware and software professionals and others, with a worldwide reputation for the highest technology. 75% of all the commercial communication satellites now in orbit and the first two satellites launched from the Space Shuttle are achievements of our Space & Communications Group near LA Airport.

Come to Hughes and Southern California. Beaches, mountains, desert, forests, Disneyland, movie studios, and Mexico are easy drives from our modern facilities. And you'll have a front row seat for the 1984 Olympics. All this, along with outstanding benefits and a competitive salary for every job mentioned above.

Please send your resume to: Lorraine Marcone, C2/C162, Hughes Aircraft Company, Space & Communications Group, Employment Dept. WC-250, P.O. Box 1042, El Segundo, CA 90245.

Creating a new world with electronics

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE & COMMUNICATIONS

Proof of U.S. Citizenship Required
Equal Opportunity Employer

SERIES 1

- PROGRAMMER/ ANALYSTS
- TEAM LEADER

San Francisco Bay Area

- State-of-the-Art systems
- IBM 3033s
- Series 1 SNA Networks

Positions offer exciting opportunities for ambitious and creative problem solvers to build and support domestic and international Series 1 SNA Networks in a prosperous dynamic company.

Candidates should provide the following qualifications:

Programmer/Analysts:

Min. 1 year Series 1 exp. to include a communications line protocol (BISYNC or SDLC)

Team Leader:

5-10 years data processing exp. to include 2-3 years in development of sophisticated Series 1 systems; record of successfully managing projects.

Outstanding company benefits program, relocation assistance available. Company contribution to employee savings plan.

For immediate consideration, please send resume, including salary history, in confidence, to Cissy VanBalen, Professionals for Computing, Inc. (Search & Personnel Services), One Maritime Plaza, Suite 1350, San Francisco, CA 94111. (415) 956-7120. Employer assumes fee.

professionals for computing, inc.

PROG/ANALYST SYSTEMS/ANALYST

IBM, COBOL, EXP. DATA BASE AND/OR COMMUNICATIONS DESIRABLE. NEW DEVELOPMENT WORK.

ALL INQUIRIES ARE HELD IN STRICT CONFIDENCE.

recruiters for industry

P.O. Box 2, Framingham, MA 01701

617-879-4770

Client companies assume all fees.

NATIONWIDE SPECIALIST
in the field of
DATA PROCESSING

DEC VAX-Knowledge of Internals+40K
IBM-Systems Capacity Planner 45K
MVS-Systems Programmer 40K

Call for details and information on other position from Coast to Coast

call Thelma: (714) 754-0196

Fortune

E.D.P. GROUP
17744 Skypark Circle, #200
Irvine, California 92714

NATIONAL/INTERNATIONAL

Sales (Military /Amsterdam) $80,000; IMS DB/DC Programmer $30,000; Insurance Systems $38,000; CAD/CAM $35,000; Consultants Open; Desing Engineers (Laser, IC, Analog, RF,FM) $35,000; C3 Developers $40,000; Medical Systems Administrative Laboratory) Several to $65,000; Product Line Mgr PC $70,000; Financial Industry Programmers (ALC,COBOL) $32,000; DEC/DG Applications Software $35,000; Field Engineers $30,000; Etc

Call or Write Bill Coren (512) 349-3666

Computer Career Resources
84 N.E. Loop 410, Ste 403E
San Antonio, TX 78216

14 years of career placement experience Independent Associates Nation Wide (Company Fee Paid Positions Only)

© Eastman Kodak Company, 1983

Software engineering at Kodak. Putting good things in small packages is one of our specialties.

From computerized manufacturing operations in the production of Kodak disc film to the design and fabrication of output driver chips for business systems equipment, computer professionals at Kodak excel at thinking small.

But Kodak's commitment to computer technology is big. Across the board, we have need for experienced, technically oriented computer scientists and software engineers.

Steady growth and diversification have created opportunities in a variety of areas, from system-level architecture to the development of software for real-time command and control subsystems in complex electromechanical hardware.

If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today to: Personnel Resources, Eastman Kodak Company, Dept. DCPW, Rochester, NY 14650.

Kodak

Kodak. The right place. The right time.

An equal opportunity employer manufacturing photographic products, fibers, plastics, chemicals, and electronic equipment. Plants in Rochester, N.Y.; Kingsport, Tenn.; Windsor, Colo.; Longview, Tex.; Columbia, S.C.; Batesville, Ark.; and a sales force all over the U.S.

EDP OPPORTUNITIES

MICROS

LAN Micro, Mini Comp Sci, main frame ..... $60M++
IBM P.C. Data Center Mgr, Software ..... $45M++
IBM P.C. Alp Pascal PC dev ..... $45M++
MICRO Support & dev, Fortran, Cobol ..... $45M++
IBM PC Find/Comm exp, Deg ... $35M+++

PROJECT LEADER

P/L B/6800 Algol/Cobol fin sys dev MBA ..... $61M+
P/1 Trading Support sys dev, Deg .... $55M+
SAS Clinic sys dev, Deg ..... $50M+
P/1 Central find dev DB, MBA deg ... $45M+
P/1 DOS/VSE Main, deg ..... $41M++
P/L Leasing sys dev, Deg OS $40M
P/1 Commodities dev, Deg $40M
P/1 Micro Basic Alp W'chester Cnty . $40M+

DATA BASE

IMS Performance tuning ..... $50M+
IDMS P/1 Direct staff dev, deg $50M
ADABAS 3rd normal form, Deg ..... $47M+
CICS IMS Internals, Deg planning ..... $47M+
DBA DLI Data dic space alloc etc ..... $45M+
IMS DB DC PCB/S $45M
DBA IDMS Internals, software ..... $41M+

Bill Borrelli (212) 349-3810
WM. HARRIS ASSOC.
35 Ann St. agency NY, NY 10038

NEW HAMPSHIRE MASS/CONN

$25 - $60K

Applications and Systems Software

Micro/Mini/Mainframe

MAS

Management Advisory Services Inc

Colonial Office Park
48 Constitution Drive
Bedford, NH 03102
(603) 472-8844

Fees and relocation expenses company paid.

Data Processing

APL PROGRAMMERS

MEDIFLEX SYSTEMS CORPORATION, the leader in applying management science and computer technology to health care institutions, is expanding the APL programming staff at our Data Center in Atlanta. These programming positions require the ability to analyze, revise and implement financial applications in the health care industry. A minimum of 3 years experience is desired and the ideal candidate will also be knowledgeable in PL1 and Assembler.

In each of the last four years, our volume has doubled and we expect to continue this trend in 1983. MEDIFLEX SYSTEMS provides a comprehensive benefit program and a salary commensurate with background. If you are interested in becoming a part of this hard working organization and if you meet the above qualifications, send your resume, in confidence, to:

Mr. Fred Garvin

MEDIFLEX SYSTEMS CORPORATION

1175 Peachtree Street
Suite 1602
Atlanta, Georgia 30361
equal opportunity employer m/f/h

position announcements | position announcements | position announcements

Computer Sales Professionals

New products...
New marketing strategies...
New strength for your sales efforts

1982 was another year of growth for NCR with revenues topping $3.5 billion. New product introductions like the Tower 1632 processor, Decision Mate V personal computer and the 2126 Retail Terminal met with tremendous customer acceptance. During 1983 we intend to continue our aggressive program of new product introductions with increased R&D spending resulting in the replacement of our entire line over the next 18 months. And we are organized to aggressively attack the market and place the full strength of our 99 years experience in business sytems behind you.

We look for proven producers with at least 3 years computer sales experience and a BS in Business Administration or Computer Science or equivalent... to market our diverse product line ranging from personal computers to POS terminals to micros, minis and mainframes.

Choose your territory:

- Los Angeles
- Orange County
- San Luis Obispo
- San Francisco
- Salt Lake City
- Denver
- Seattle
- Dallas
- Houston
- Albuquerque
- Omaha
- plus others

We offer an attractive compensation package based on salary plus commission.

Interviews during NCC

To arrange an appointment, call Monday thru Wednesday (May 16-18) from 9 am to 12 noon.

Steve Jacobs COLLECT at (213) 556-5277

Or you may arrange a convenient interview at a later date in your own city by forwarding your resume with earnings record to Mr. Jacobs, NCR Corporation, P.O. Box 24880, Los Angeles, CA 90024.

NCR

Complete Computer Systems

An equal opportunity employer

Decision Support Systems Analyst

American McGaw is a major division of American Hospital Supply Corporation, recognized internationally, and a pioneering leader in the development of irrigation/intravenous solutions and nutritional products which are in high demand throughout the world.

Currently, we have an excellent career opportunity for a Decision Support Systems Analyst within our Information Systems Department.

Ideal candidates will possess 2-5 years experience in the use of computers for solving a variety of business problems. Background must include the use of a fourth generation programming language, such as FOCUS, RAMIS II, EXPRESS, etc., as well as COBOL or PL/I programming experience in an IBM, IMS DB/DC, MVS environment. A Master's degree in business, economics, computer sciences or related discipline is required; good communications skills are essential.

Duties will include: Sales/Marketing systems development and maintenance; database design, implementation and support of a fourth generation programming language; development of analytical computer models for Sales/Marketing, and other departments upon request.

We offer a highly competitive salary and benefits package, high visibility, and the satisfaction of working as part of a highly professional team. For immediate consideration please submit your resume, including salary history, to:

Theresa K. Recht
Professional Staffing
American McGaw
Division of
American Hospital Supply Corporation
2525 McGaw Avenue
Irvine CA USA 92714

We are an equal opportunity employer m/f/h

PROGRAMMER ANALYSTS
RENO, NEVADA

Data Processing opportunities in the Biggest Little City in the World are few and far between. Employment with Sierra Pacific Power, Northern Nevada's largest D.P. employer, would allow you to maximize professional growth while enjoying the type of low congestion - low crime - outdoor family lifestyle found only in a Sierra Nevada recreational area like Reno. If that's not enough, we're only 45 minutes from the ski lifts and aquarium clear water of world famous Lake Tahoe.

Our environment features two IBM 3031's and an IBM 3083 on order under OS with MVS/IMS and CICS. Ideal candidates for our current openings will be degreed and have 3-5 years of business programming experience.

In addition to moving expenses, we're offering a top salary and benefit package. If interested, please submit your resume to:

PROFESSIONAL STAFFING

SIERRA PACIFIC POWER COMPANY
P.O. Box 10100 • Reno, Nevada 89520
An Equal Opportunity Employer M/F/H/V

THE BEST IS JUST BEGINNING

Amerifirst's first 50 years of vigorous growth, diversity and innovation have set the stage for even newer ways to meet the more sophisticated needs of customers today ...and tomorrow. As we expand into a greater variety of services — a move which will double our size within the next 5 years — our growth will be exceeded by that of our data processing department, creating challenging, advancement-oriented opportunities for fully qualified:

with Florida's financial leader

NCR PROGRAMMERS

Proven expertise in NEAT III Levels 1 and 2, plus knowledge of banking applications are required for an environment in which all 57 of our present branches are on-line to our dual NCR Criterion 8585.

To discover more about our growth opportunities, attractive salaries and benefits — including flextime (work four 10-hour days or five 8-hour days) — please submit your resume, in confidence to Susan Kuryla, Employment Supervisor, AMERIFIRST, One Southeast Third Avenue, Miami, FL 33131. (305) 577-6591.

AMERIFIRST

An Equal Opportunity Employer M/F

In a bind?

Do you need real professionals?

Advertise in Computerworld to find exactly who you're looking for.

To place your ad or to get a rate card call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
617-879-0700

Software Support Specialist

The Pfizer Connecticut Data Center has an attractive career opportunity for a software support specialist to assist in the installation and maintenance of a TOPS-10 operating system in a SMP environment. Responsibilities will aslo include developing system software for DECsystem-10, VAX and PDP-11 computers.

Background should include a BS/MS in computer science or EE, a working knowledge of MACRO-10 and 1-3 years of relevant experience. Knowledge of computer networks, graphics, DBMS and scientific applications a plus.

This position offers a stimulating professional environment in an attractive Connecticut shore area, complemented by competitive compensation, benefits and relocation assistance. Qualified applicants may submit detailed resume in confidence to: Lorraine C. Corr, Personnel Associate, Pfizer Central Research, Eastern Point Road, Groton, CT 06340.

Pfizer

An equal opportunity employer

Our computer carefully inspects resumés from major cities throughout the country and makes two piles:

QUALIFIED FOR YOUR OPENING

UNQUALIFIED FOR YOUR OPENING

Find an MBA on our MLS.

ROMNET⊖ is our instant electronic telecommunications system, a nationally-linked, multiple listing service that allows your ROMAC® professional to alert every ROMAC® office in the country of your company's new opening.

Because ROMNET⊖ also stores resumé information on an applicant's skills, experience, education, salary expectations and geographical preference, we can begin searching for your new accounting, data processing, or banking key employee immediately.

Free yourself of the hassle of handling dozens of introductory interviews. Contact your ROMAC® professional today, and let us take care of those details for you. We'll bet our experience against your company's needs because the ROMAC® difference is experience.

ROMAC

CORPORATE OFFICE
Three Canal Plaza,
P.O. Box 7469 DTS, Portland, ME 04112
800-341-0263 or 207-773-6387

Data Processing

PROGRAMMERS PROGRAMMER/ANALYSTS

IBM SYSTEM/38

Dynamic Control Corporation, a leader in developing software for the health care industry, has outstanding opportunities available in Orlando, FL for experienced data processing professionals. Our continued success and rapid growth have created positions for skilled professionals who want to work in a state-of-the-art environment while increasing their income. Opportunity for international travel.

Minimum qualifications include:

- 2-3 years of coding RPG II or RPG III
- S/3, S/34, S/38 experience
- Exposure to an interactive environment

We are offering nationally competitive salaries, a good benefits package including relocations, health and life insurance, profit-sharing and more. Send resume and salary history today:

Attention: Darryl LaFace
DYNAMIC CONTROL CORPORATION
1311 S. Semoran Boulevard
Winter Park, FL 32792
or call (outside Florida)
1-800-327-5362
(in Florida)
(305) 671-4483

An Equal Opportunity Employer M/F

THE QUALITY SOFTWARE TEAM IS EXPANDING

Are you ready to participate? Design, development, and implementation of quality software systems is the #1 priority at Sperry. We have over seventy locations throughout the continental United States providing customized software support to our defense and commercial contracts. We are seeking Software Specialists to join our team of talented, dedicated personnel. If you have experience in the following areas, we want to talk with YOU.

HARDWARE

AN/UYK-7
AN/UYK-20
UNIVAC 1100 SERIES
DCP 20/40
MILITARY DATA LINKS
VAX 11/780
PDP 11/34
SIGMA 5
PERKIN ELMER 3200
SEL 32

OPERATING SYS.

DMS-1100 CMS-1100
EXEC-8
RSX-11M
VMS
OS-32

LANGUAGES

ULTRA 32
ASSEMBLY
COBOL-1100
FORTRAN
CMS-2(Y)(M)
TIP
SYMON/SYCOL
ECL
MASM
COBOL
CONVERSION (LARGE SYSTEMS)
FORTRAN 77
ADA

APPLICATIONS

REAL TIME DC
TELCON
C3
EW
ASWOC
NTDS
ASW
SOFTWARE QA
SOFTWARE CM
SIGNAL PROCESSING
GRAPHICS
METEOROLOGY
RADAR DATA

Our positions are diverse. We have openings for Programmers, Applications Analysts, Systems Engineers, Technical Leaders, and much more. Most positions require a Computer Science or related degree plus several years of hands-on experience or equivalent training and experience. In addition to a challenging work assignment, we offer excellent salaries and a comprehensive benefits package. If you're ready to join our quality software team, test the worth of your experience by sending a resume to one of the following locations:

For Western U.S. Positions:
Attn: Bob Elmer
Mail Station CD2C01
P.O. Box 43525
St. Paul, MN 55164-0525

For Eastern U.S. Positions:
Attn: Barbara Glover
Dept: CW
1901 N. Moore St.
Arlington, VA 22209

SPERRY CORPORATION
COMPUTER SYSTEMS
TECHNICAL SERVICES

Equal Opportunity Employer M/F/V/H
Principals Only

SPERRY

HIGH TECH PROFESSIONALS
Salary area $45,000+

Take your place in this state-of-the-art technology center. You will determine your own career path with this progressive organization. Degree and U.S. citizenship are required.

POSITIONS OPEN INCLUDE:
Real Time Software Systems
Signal Processing Systems
Communications Systems Engineers
Microprocessor Engineers

We also have a number of oversees positions, with one year contracts, if you have experience in PL1, IMS, MVS.

For additional information, contact J. Schneider at (713) 784-3880.

ALL FEES ASSUMED BY CLIENT COMPANIES

M. DAVID LOWE
PERSONNEL SERVICES
6117 Richmond Avenue
Houston, Texas 77057

UNUSUAL OVERSEAS OPPORTUNITY FOR EXPERIENCED T.I. MICROCOMPUTER SPECIALIST

Major Swiss company located in Zurich area requires bi-lingual (American-German) graduate in electrical engineering or computer science to work on new R & D project. Company developing new machine control system. Three-year minimum assignment in Switzerland with option for extension or re-assignment in the U.S. Requires minimum of three years experience in control systems and T.I. Systems, MPP, AMPL, Microprocessors, E-boards and I.C.s. Must be able to work in Basic, Pascal, T.I. Assembler, MPP and Fortran.

Excellent salary with all relocation expenses paid. Send detail resume with salary requirements to:

CW-84144
Computerworld
Box 880
Framingham, MA 01701

position announcements | position announcements | position announcements

SAS Institute... setting the pace

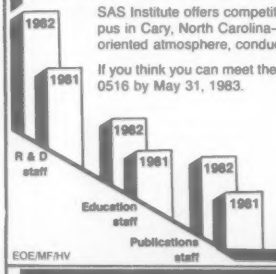
At SAS Institute, we are committed to providing the best in software and service. We offer a complete line of Institute Program Products for data management, statistical analysis, report writing, color graphics, forecasting, and data entry. We support these products through ongoing research and development, a complete library of documentation, and a comprehensive training curriculum. Currently, we have openings for:

VM/CMS Systems Software Developer will develop and maintain VM/CMS systems software for internal applications and Institute Program Products. Applicants must have a minimum of one year's experience as an OS/VS1 or OS/MVS systems programmer, and one year's experience as a VM/CMS systems programmer as the most recent job experience, including writing SVC traps, I/O traps, and applications requiring knowledge of the VM/CMS assembler macros. Candidates must possess excellent assembler language knowledge and use assembler as the primary programming language. A working knowledge of PL/I and SAS software is also desirable. A bachelor's degree, preferably in computer science, and excellent communications skills are required.

OS/VS Systems Software Developer will develop and maintain the SAS system supervisor and related components for the IBM OS/VS and MVS/XA environments. Use of IBM System/370 Assembler as a primary programming language, and a working knowledge of OS/VS supervisor and data management services macros are required. Experience with the development and support of large software systems and the use of IBM service aids is desirable. Familiarity with operating system concepts, compiler design and implementation, PL/I, and the SAS System, are significant assets. A bachelor's degree, preferably in computer science, or equivalent experience is required.

MVS Systems Programmer will support MVS and MVS/XA systems software and related products on a 3083 processor. Duties include installing, maintaining, enhancing, and modifying IBM and OEM vendor software products; working with operations personnel in problem solving; and providing assistance to internal users. Applicants must have a minimum of five years' systems programming or technical support experience with three years as an MVS systems programmer. Experience with SMP and technical proficiency in assembler language are required. Experience with JES2, TSO, and ACF/VTAM is highly desirable. Knowledge of PL/I and IMS/VS or CICS/VS is a plus.

DOS/VSE Systems Programmer will support DOS/VSE systems software and the conversion and maintenance of Institute Program Products for the DOS/VSE environment, including graphics and full-screen applications. Applicants must have a bachelor's degree and excellent assembler language knowledge. Knowledge of CICS/DOS/VS is a plus. IBM 3279 or 3287 hardware experience, DOS PL/I experience, and any knowledge of OS/VS and VM/CMS are particularly useful.



SAS Institute offers competitive salaries and excellent benefits. The attractive, 100-acre lakeside campus in Cary, North Carolina—adjacent to the prestigious Research Triangle Park—provides a people-oriented atmosphere, conducive to personal productivity and inventiveness.

If you think you can meet the challenge at SAS Institute, send a detailed letter or resume to Department 0516 by May 31, 1983.

SAS Institute...setting the pace in applications and systems software.

SAS Institute Inc.
Box 8000
Cary, North Carolina 27511

EOE/MF/HV

BUSINESS APPLICATIONS PROGRAMMER ANALYST

Rockwell International's Missile Systems Division has immediate openings for experienced programmers. The qualified candidates will have 3 to 5 years experience in COBOL programming. Must be knowledgeable in OS JCL. Previous experience should include utilizing IMS, ROSCOE, LIBRARIAN, or TSO. Responsibilities will include functional user requirements, development of new information systems on larger scale IBM computer using MVS JES. Applicant with manufacturing exposure, or experience on IBM 8100 preferred.

Our company benefits package is excellent and salary is commensurate with experience. Qualified and interested individuals should send resume, including salary history to:

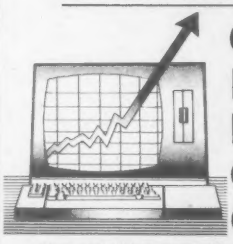
Jim Lenoir
Missile Systems Division
Rockwell International
1800 Satellite Blvd.
Duluth, GA 30136

Rockwell International

Equal Opportunity Employer M/F
U.S. Citizenship Required

...where science gets down to business

General Electric Professional Services Company



Going Beyond The Boundaries Of Ordinary Growth

Sure, a lot of DP professional service organizations talk about their growth. But if you'd like to apply your innovative ideas with a company that lets their actions do the talking, consider General Electric Professional Services Company. A subsidiary of General Electric Information Services Company, and a company that's experienced growth that is double the professional services industry standard. That's right, double.

We offer technical Specialists with 2+ years experience in UNIX/C, IMS PL/1 or IMS COBOL the opportunity to become absorbed in a varied selection of challenging applications and environments.

Plus our salaries and benefits are competitive, and our current openings are in a number of attractive cities. So, if you qualify, and you're ready to start for a company whose growth is a hard cold fact, and not just hot air, send your resume to: **Cheryl M. New, Personnel Manager, General Electric Professional Services Company, 45 Knightsbridge Road, Piscataway, New Jersey 08854.**

INFORMATION SERVICES
General Electric Professional Services Company
Equal Opportunity Employer M/F

Product Manager

We seek a forward-thinking individual with a keen sense of business purpose to get involved in the design of product development strategies, product marketing strategies, and the definition of product requirements for the software we create. In the important role of a Product Manager, you will coordinate a product through development, promotion and release. You will also have the opportunity to develop and coordinate the execution of business plans.

To qualify, you should have knowledge of the mini or super-mini market for business applications and/or of the software product market, particularly in the area of Data Base Management Systems. You will need marketing and/or sales experience (NCR marketing experience is desirable) and a BS in Business Administration preferred.

We offer a competitive salary and benefits package and beautiful working environment, as well as the opportunity to enjoy year-round outdoor recreation in highly desirable San Diego. If you are ready for this kind of fast-paced career opportunity, send your resume to: **Personnel Resources, NCR Corporation, Dept. X55, Systems Engineering - Scripps Ranch, 9900 Old Grove Road, San Diego, CA 92131.**

NCR
Complete Computer Systems
An equal opportunity employer

We'll keep you up to date week, after week, after week, after week.

Director For Technical Planning

OCLC, the major developer and supplier of computerized library resources is seeking a person to join us in our innovative efforts. The person we seek will provide planning and direction across a full range of technical issues and concerns.

To handle this highly visible and responsible position you must have an advanced degree (masters or higher) in a computer science related discipline; a minimum of 5 years experience with large online systems, including databases; and, state-of-the-art knowledge of distributed processing and telecommunications, and computer and peripheral hardware/software systems design technology.

This position reports directly to the Vice President of Planning and Research. The ideal candidate will have the all important breadth of knowledge rather than being an expert in single related areas. Excellent people skills and planning techniques are essential; technical knowledge of library automation systems is desirable.

For prompt consideration, send your resume to:

OCLC Human Resources Department
6565 Frantz Road
Dublin, OH 43017-0702

We Are An Equal Opportunity Employer M/F

OCLC

position announcements | position announcements | position announcements | position announcements | position announcements

INSTRON

SENIOR PROGRAMMER/ ANALYST

If you are challenged by designing and implementing "state-of-the-art" manufacturing applications, Instron has an outstanding career opportunity.

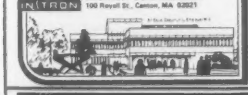
The successful candidate should have 5-6 years experience in manufacturing application systems development in an IBM environment. Primary duties are to develop a broad range of batch and interactive business and manufacturing systems utilizing DBMS concepts.

Additional requirements include: 2 years of teleprocessing programming, strong COBOL proficiency and good communication skills. Desirable experience includes RPG II, IDMS or DL-I.

Excellent starting salary and comprehensive benefit package program. Please send your resume and salary requirements in confidence to:

Jonathan Burr
Director of Personnel

INSTRON CORPORATION
100 Royall St., Canton, MA 02021



Placing Systems Analyst and Programmers is our specialty!

Need We Say More?

CONTACT
Larry Stone or Jimmy Buck
704/375-0600
Call Collect

FOX-MORRIS
Personnel Consultants
1350 The Johnston Bldg.
Charlotte, NC 28281
Clients Nationwide
Of course, all fees paid by client co.

IN SAN FRANCISCO... ITS SPRINGTIME ALL YEAR ROUND!

If you are an experienced DATA PROCESSING PROFESSIONAL with skills in Large Systems or Minis, DATA BASE or ON-LINE SYSTEMS, consider a move to the beautiful SAN FRANCISCO BAY AREA. Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
One Market Plaza, Spear Tower, Suite #2014C
San Francisco, CA 94105 • (415) 777-3900

ASSISTANT DIRECTOR OF COMPUTER SERVICES

Applications are invited for the position of Assistant Director of Computer Services. This position is responsible for developing and implementing systems to support the academic mission of the college, as well as develop software for administrative applications. The incumbent in this position will also be responsible for teaching computer related courses as required.

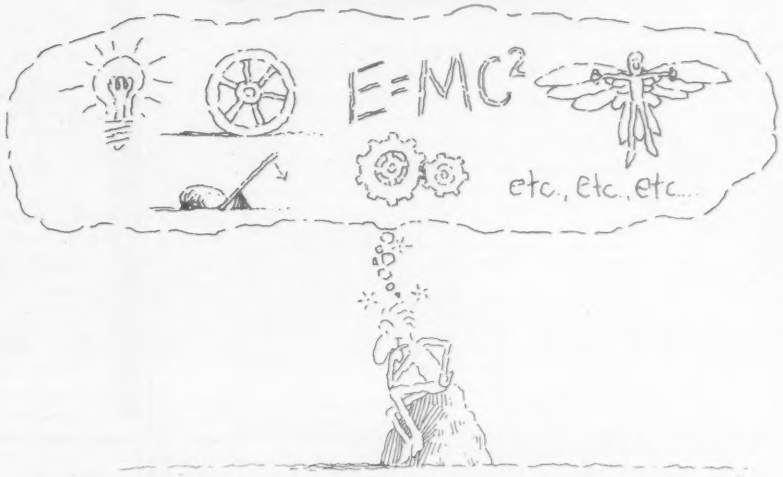
Applicants should possess a Masters Degree in computer science or related field; have a working knowledge of COBOL, BASIC and FORTRAN; be able to work effectively with all constituencies of the college and have knowledge of micro computers and CAI.

Saint Mary's College is a private, Catholic, women's residential college with an enrollment of 1800 and is located in Notre Dame, IN. Candidates should send a letter of application and resume by June 30, 1983, to Robert S. Foldesi, Personnel Director, Saint Mary's College, Notre Dame, IN 46556.

Equal Opportunity Employer.

DATA PROCESSING PROFESSIONALS

WE ARE THE TECHNICAL SERVICE ARM OF ONE OF THE LARGEST UTILITY SYSTEMS IN AMERICA AND WE NEED PEOPLE WHO CAN GENERATE IDEAS!



In a world of high-powered, high technology, Middle South Services -- the technical service arm of Middle South Utilities, is offering exceptional career opportunities for data processing professionals who can meet our expanding needs. Our advanced EDP environment is set up with two IBM 3081's and Tandem mini-16's to service the multi-faceted needs of a ten-billion dollar electric utility system, headquartered in New Orleans.

If you're a DP dynamo, with the experience and background we require, you can generate an outstanding career for yourself in a creative environment designed to encourage personal and professional growth.

SYSTEMS ANALYST requires 2+ years IBM experience, plus a thorough understanding of the logical design in IMS DB/ DC. Knowledge of ADF, Data Dictionary concepts, Mark IV, Panvalet is a plus.

ANALYST PROGRAMMERS should have 3+ years experience with COBOL, IMS DB/ DC, plus 3 years Business Applications or plant maintenance systems. Knowledge of ADF, Data Dictionary concepts, Mark IV, Panvalet is a plus.

ANALYST PROGRAMMER (Enhancement Team) must have 2+ years experience in financial applications, and be skilled in OS/MVS and VSAM with a strong emphasis on PL1. Working knowledge of Assembler is helpful.

SYSTEMS ANALYST (Enhancement Team) will have 3+ years experience in Systems Analysis, with experience in customer billing and/ or Accounts Receivable. Knowledge of accounting control procedures with PL1 in an IBM environment preferred. CICS (MACRO), Assembler experience preferred.

The advantages of working with a major electric utility include an excellent salary and benefits package. For more information, call our toll-free number below, or send your confidential resume, specifying which position you are applying for to: Richard Jackson or Byron Heath, MIDDLE SOUTH SERVICES, INC., P.O. Box 61000, New Orleans, Louisiana 70161.

We are an equal opportunity employer. M/F.

1-800-231-4481

In Louisiana call collect (504) 569-4962.

MIDDLE SOUTH SERVICES INC.
THE PROFESSIONALS IN POWER

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

CENTRAL INTELLIGENCE AGENCY OFFICE OF SECURITY

The Central Intelligence Agency is offering a challenging career opportunity in support of their computer security program. Experienced individuals with a technical background and strong analytical skills needed to develop and implement comprehensive information systems security programs working with state-of-the-art computer systems architecture, data base management system, local area networks, and telecommunication applications. Candidates should possess two or more years experience in any of the following areas:

Operating System Internals
(OS/MVS, JESII/JESIII)
VM/370 System Internals
VAX/VMS System Internals
Minicomputer Systems Internals
Telecommunications and Front End Processors
TSO, CICS
IMS/Other DBMS's
Secure Operations System Architectures (KSOS, KVM)
Data Security Hardware Design/Software Applications

Salary: To $35,000/40,000 per year depending upon qualifications

Minimum Qualifications: Bachelors Degree with a minimum of five years overall working experience with computer systems. Advanced degree desirable. Must be willing to travel domestically. Employment contingent upon obtaining full security and medical clearance. United States citizenship required.

Forward detailed resume to:
Personnel Representative (EF)
Department A, Room 821
P.O. Box 1925
Washington, D.C. 20013

Join a revolution.

Join the people who've joined Apple.® Makers of the world's most personal computers. And the home of Lisa.™ Apple's newest, most revolutionary personal computer.

More people are doing more things with Apples than with any other personal computer. That means we need more people to help us make more Apples. People like you. So join the revolution.

IDMS/Cullinet Database Experts.
Join the Dawning of the Software Age.

Apple and Cullinet have begun a journey to develop and implement the most highly integrated information systems solutions in corporate America. We believe the successful attainment of our goal will serve as an example of what technology can do to maximize profitability and people productivity. The total integration of Apple's Lisa, Apple ///, and Apple II with Cullinet's full product line is part of the excitement, the challenge, and the fun ahead.

Apple's MIS organization needs your Cullinet product expertise and data administration, database technology, and applications development experience.

You should have 3-5 years related database experience and have worked in a large information processing organization.

A history of achievement and excellence is a must. A technical degree is desired.

If you are qualified, please send your resumé to D. Bridgeman, Apple Computer Inc., Dept. C-3, MS 16-B, 20525 Mariani Avenue, Cupertino, CA 95014.

apple
An equal opportunity employer

Now that you know where the world is going, consider the advantages of getting there first.

IMS SPECIALISTS

Let us relocate you to Southern California!

We are currently seeking experienced IMS Specialists to join us at our Orange County Headquarters. Our environment includes an IBM 3033 OS/MVS and an Amdahl 470 V/8 with TSO/SPF, VTAM, CICS and THE LARGEST IMS DATA BASE IN THE U.S.!

- **IMS APPLICATIONS SYSTEMS SPECIALISTS**

Assignments will include the analysis, design and implementation of large scale IMS DB/DC Fast Path systems. Requires experience as a technical lead on large development projects including prior experience with large system software replacement and IMS data base conversion. Fast Path and Yourdan methodology experience highly desirable.

- **IMS SYSTEMS PROGRAMMER**

Responsible for the installation, maintenance and performance tuning of large scale IMS/VS Fast Path data bases in a multiple CPU, MVS environment. Requires a minimum of 5 years systems programming experience with at least 3 years in a primary role of MVS IMS/VS systems operation support and software maintenance. Fast Path experience highly desirable.

Our people enjoy a progressive environment composed of top professionals and responsive management. We offer competitive salaries, excellent company-paid benefits and **full relocation!** Call collect or send your resume in confidence to:

Deana St. John
TRW-ISD
505 City Parkway West,
Suite 100
Orange, CA 92668
714.937.2487

TRW

Equal Opportunity Employer

Honeywell GCOS expert-Supervisor of Technical Services

Our Role: General Electric Credit Corporation creates custom tailored financial packages for thousands of major corporations. Our burgeoning projects and expertise mean wide career options for those professionals with the talent to meet the complex needs of our diverse clients.

Position Scope: As Supervisor of Technical Services at our Stamford, Connecticut Headquarters operation, your overall responsibility entails the development and maintenance of specialized software and hardware configuration planning.

Your Qualifications: As an expert in Honeywell GCOS, you will have 3-5 years experience in Honeywell GCOS operating system internals, support and maintenance. This highly responsible position will build upon your knowledge of Honeywell hardware, mass storage, device failure protection and recovery/restart as well as upon your experience with compilers, assemblers and file management software. We prefer a technical degree.

Contact: Find out about the growth opportunities, excellent compensation and outstanding benefits and attractive convenient location by sending your resume to Ms. Pat Keleti, General Electric Credit Corporation, Ref. 48C, 260 Long Ridge Road, Stamford, CT 06902.

General Electric Credit CORPORATION

An equal opportunity employer

RAMIS II/FOCUS

FOURTH GENERATION SOFTWARE SERVICES, INC. invites individuals with significant experience developing systems solutions to business problems using RAMIS II and/or FOCUS to apply for positions in what we intend will become the pre-eminent consulting company specializing in fourth generation systems technology. Initial assignments are in the New York to Philadelphia metropolitan area, but special consideration will be given those who are amenable to travel and/or relocation as we grow.

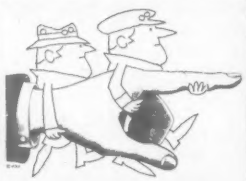
Candidates for consulting positions should have:

- **2 years of RAMIS II/FOCUS experience**
- **4 years of sound DP experience**
- **strong communications skills**
- **excellent interpersonal skills**
- **leadership experience or potential**
- **prior consulting or client/user exposure**

For those real pros who meet our high standards, we offer comprehensive benefits, outstanding salaries, liberal expense policies, and bonuses that directly reflect one's contribution to company growth.

If you fit the profile and are looking for real challenge and growth with rewards corresponding to accomplishments, please tell us about yourself by calling or writing:

DAVID H. LOVELL, PRESIDENT
FOURTH GENERATION SOFTWARE SERVICES INC
Clinton Professional Center
65 Old Highway 22, Clinton, New Jersey 08809
(201) 735-6300



COMPUTERWORLD Can Point You In The Right Direction

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.

Be sure to look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

SOFTWARE DESIGNERS

Systems level experience to design systems utilities for AUTODIN Telecommunications Program and act as systems level designer programmers. Familiar with BAL and PLM66 and INTEL products.

HARDWARE DESIGNERS

EE, ME, CRT, Digital Control, and Reliability

Astronautics Corp. of America
P.O. Box 523
Milwaukee, WI 53201
(414) 447-8200

An Equal Opportunity Employer

University of Florida
Department of Computer & Information Sciences

Applications are invited for a tenure-track assistant professor position. The preferred starting date is August 1983.

Candidates should have a Ph.D. in Computer Science or in a related field and potential excellence in teaching and research.

Salary is competitive and commensurate with qualifications. Application deadline is May 31, 1983. Send resume and three references to:

Chairman, Faculty Screening Committee, CIS Department, 512 Well Hall, University of Florida, Gainesville, FL 32611, 904/392-2371.

An equal opportunity/ affirmative action employer

GIBRALTAR

ITEM PROCESSING ANALYST

If you are looking to join a progressive and rapidly expanding corporation, then consider Gibraltar Savings. Our Data Center, which will be relocating to freeway-close Burbank, has this opportunity for an experienced professional.

The position requires 2-3 years as an Analyst with strong technical skills and project ability. 2 years S&L or Commercial Bank background, specifically in item processing, mandatory. Will have a key position in selection of hardware and software package for our new Item Processing Center. Excellent written and oral communication skills necessary. Programming background helpful.

If you would like to be part of a challenging environment, and would like to investigate this opportunity, please forward your resume and salary requirements to:

GIBRALTAR SAVINGS

12012 Chandler Blvd.
North Hollywood, CA 91607
Attn: Barbara Felender

Equal Opportunity Employer M/F/H

GIBRALTAR FINANCIAL GROUP

An Equal Opportunity Employer M/F/H/V

SUNBELT *IMS*

California to Florida

Immediate need for application and software IMS professionals. Coast to coast coverage. Contact us now and make harsh winters a memory! Call collect or send resume.

SUPERIOR RESOURCES

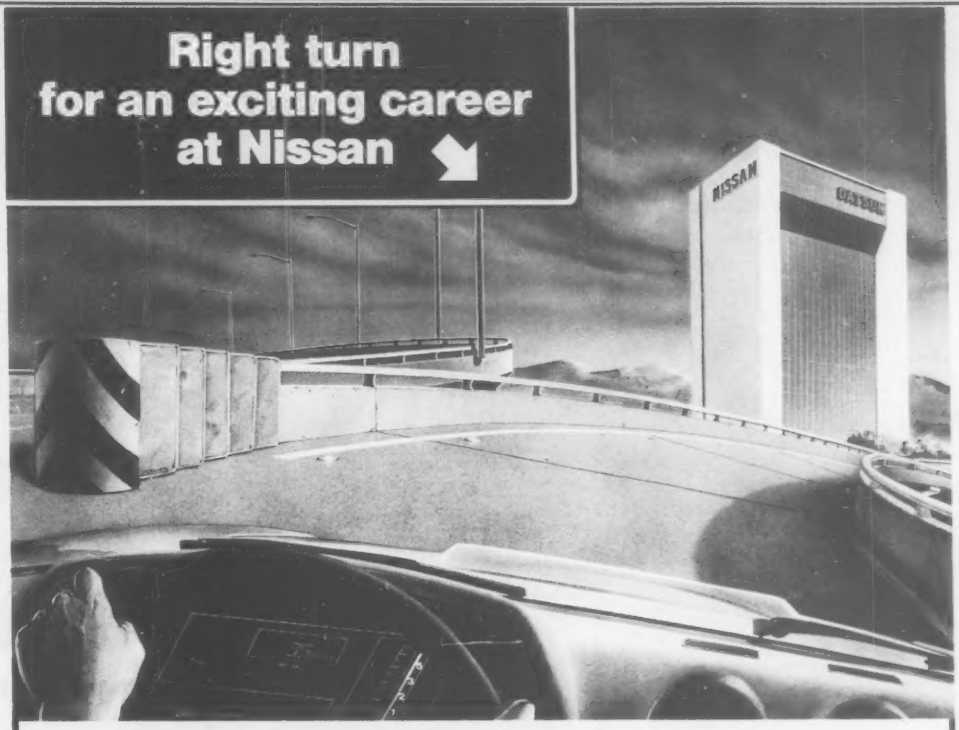
Personnel Services · Employer Retained
17141 Ventura Blvd. #200
Encino (Los Angeles) CA 91316
(213) 986-4400
Member National Computer Assoc.

Mississippi State University
Mississippi Agricultural & Forestry Experiment Station
Computing Services

Programmer/Analyst

Job responsibilities: The design, development, documentation, implementation, and maintenance of software for administrative applications; supervision of student programmers in development of needed software. Minimum qualifications: B.S. degree in Computer Science with one year of experience in software design and development preferred. Experience with software development of microcomputer as well as a working knowledge of the programming languages of BASIC, FORTRAN, and COBOL is required. Salary is dependent upon qualifications. Send resume and names, addresses, and phone numbers of three references by June 30, 1983 to: **Mr. Michael A. Argo, Drawer EB, Mississippi State, MS 39762.** An Affirmative Action/Equal Opportunity Employer.

Right turn for an exciting career at Nissan



IBM 3083 and 3033 OS/MVS environment...options to buy or lease Datsuns at special employee prices...4-day work week option...excellent training opportunities...competitive salaries...people-oriented atmosphere...performance bonuses...complete company-paid benefits - when you add it all up, not many companies can offer what Nissan can.

And, if you have experience in any of the following disciplines, exceptional opportunities exist for you to become an integral part of our Major Information Systems Programs at our Los Angeles Headquarters.

SR. PROGRAMMER ANALYSTS
(L.A. AREA RESIDENTS ONLY)
To be eligible, you'll need a minimum of 3 years of COBOL OS/VS experience in a large IBM shop. CICS and/or ADABAS background desirable.

DATABASE ANALYST (ADABAS)
A minimum of 5 years' DP experience, including 1 year utilizing ADABAS in a database administration role, is required for this position. Knowledge of CICS TP Monitor a plus.

SYSTEMS PROGRAMMERS
(L.A. AREA RESIDENTS ONLY)
5 years of DP background and 1+ years of CICS or MVS systems programming required for these opportunities.

If you'd like to join our progressive corporate facility, call our 24 hour TOLL FREE number: (800) 821-7700, ext. 604, 7 days a week.

Or, forward your resume or a letter detailing your experience and career interest to:

NISSAN MOTOR CORPORATION
P.O. Box 191-LC/CW
Gardena, CA 90247

Principals only
An Equal Opportunity Employer M/F

The right turn for your career

NISSAN

SR PROG/ANALYST

Prog & sys development of mfg sys. IBM OS, COBOL, exp w/data capture sys a ++. Rapid advancement potential.

Salary $25-30K

FEE PAID (513) 224-0600

ROBERT HALF OF DAYTON, INC.
ONE FIRST NATIONAL PLAZA
DAYTON, OH 45402
Lic. DAPC Member

IMS or PARS/ACP

SMC, a $50M AMEX consulting firm invites resumes or calls for salaried and subcontract positions.

Mr. Carroll Satterfield
SCIENCE MANAGEMENT CORP.
11511 Katy Frwy., #150
Houston, TX 77079
(713) 531-0493

THE ARECIBO OBSERVATORY

SENIOR SOFTWARE ENGINEERS

The Arecibo Observatory, site of the world's largest Radio/Radar Telescope, invites applications for Senior Computer Staff Positions. Typical projects will include design and enhancement of real-time data-taking systems and operating system augmentation. The Arecibo Observatory supports pre-eminent research in the fields of Radio Astronomy, Radar Astronomy, and Atmospheric Physics, and offers a challenging high-technology environment in a Caribbean setting.

Salary competitive. Benefits include contributions to moving expenses, medical and life insurance, TIAA/CREF, and tuition for english language school.

CONTACT:

Dr. D. B. Campbell
Director
Arecibo Observatory
P.O. Box 995
Arecibo, Puerto Rico 00613

CORNELL UNIVERSITY is an affirmative action/equal opportunity employer

NEW ENGLAND'S *FINEST*

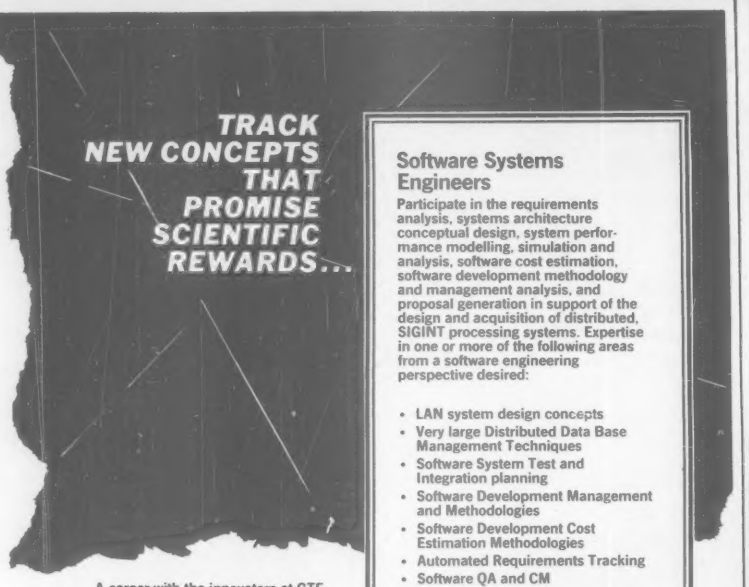
Quite simply, that's what we offer our applicants: contact with the **FINEST** Companies in New England. Through years of specialization in EDP and Engineering placement, we have a broad base of industrial, insurance, banking, defense, and service clients with openings at every level, including:

SOFTWARE ENGINEERS	TO 50K
SYSTEMS PROGRAMMERS	TO 42K
PROJECT LEADERS	TO 40K
PROGRAMMER/ANALYSTS	TO 35K
GRAPHICS/SOFTWARE	TO 48K

Send resume or call toll free: **1-800-628-3374**. In Massachusetts call (collect): **413-781-0982**.

MEMBER npo 130 affiliates coast-to-coast

dp Specialists
DYNAMIC PERSONNEL SYSTEM
P.O. Box 539
West Springfield, MA 01090



A career with the innovators at GTE promises a world of challenges, achievement and rewards. That, plus the fact that GTE supports continuing education through professional association and college tuition reimbursement programs as well as our beautiful countryside location just outside of Washington, D.C., makes for professional opportunities well worth investigating. Send your resume TODAY, indicating desired position, to: Professional Employment, Dept. CB 21, GTE Systems, 1700 Research Blvd., Rockville, MD 20850.

An Equal Opportunity Employer M/F

GTE Systems

Software Systems Engineers

Participate in the requirements analysis, systems architecture conceptual design, system performance modelling, simulation and analysis, software cost estimation, software development methodology and management analysis, and proposal generation in support of the design and acquisition of distributed, SIGINT processing systems. Expertise in one or more of the following areas from a software engineering perspective desired:

- LAN system design concepts
- Very large Distributed Data Base Management Techniques
- Software System Test and Integration planning
- Software Development Management and Methodologies
- Software Development Cost Estimation Methodologies
- Automated Requirements Tracking
- Software QA and CM

BS/MS in Math/CS/EE with minimum of 5 years' software engineering experience required.

Software Development Engineers

Responsible for the design, implementation, integration, and testing of software for communications processing systems. Opportunities for technical management available. Experience with HP & RTE or PDP-11/70 desired.

BS/MS in Math/CS/EE with minimum of 3 years' software engineering experience with structured design methodologies required.

Engineering

Field Service Instructor

System Industries, a world leader in providing high-capacity, high-performance storage systems for mini/super-minicomputer users, is currently seeking a field service instructor/course developer.

If you have at least 5 years' experience in computer field service with a minimum of 3 years in a formal field service training position, you may be qualified to join System Industries' rapidly expanding training department. You will contribute to the ongoing development of field service training programs for implementation at the corporate training center and will assist in field seminars.

For immediate consideration please call W.J. Basset or Jean Abbott at (408) 942-1212, or send your resume to Personnel Department, System Industries, 1855 Barber Lane, P.O. Box 789, Milpitas, CA 95035. We are an equal opportunity employer.

SYSTEM INDUSTRIES

SR. SOFTWARE SYSTEMS PROGRAMMER

As the representative for a major Midwest-based, Fortune 500 corporation, we are seeking a highly qualified software systems programmer who can assume total responsibility for the development, installation, maintenance, monitoring and alteration of complex operating systems or communications system sub-system.

Your experience must include a working knowledge of MVS (familiarity with SP1.3 a plus), JES II, TSO/ SPF and SMP. In addition, experience with performance monitoring and capacity planning is desirable.

You'll enjoy a sophisticated, challenging environment, excellent salary based on your experience and abilities, comprehensive corporate benefits and growth opportunities. Please send your resume and salary history/requirements, in strictest confidence to:

Industrial Recruitment Associates Inc.

P.O. Box 81365 • Dept. 11186
Cleveland, Ohio 44181
An Equal Opportunity Employer M/F/H/V
All Fees Company Paid

COMPUTER CAREERS

Associated Grocers of Arizona, Inc., the Southwest's leading wholesale grocery distributor, is seeking candidates for the following data processing positions in its IBM 4341 environment:

COMPUTER SERVICES MANAGER
Salary $33,000 to $39,000. Bachelor's degree in computer sciences or management; 6 years experience in a data processing IBM environment.

DASD COORDINATOR
Salary $24,000 to $28,000. 2 years analysis of DASD STATUS, DISK SPACE availability, update, trend and coordination of efficient use of available disk space.

JCL ANALYST/SCHEDULER
Salary $18,000 to $25,000. 3 years JCL experience on large IBM mainframes, UCC-1, 3, 7 and 11 experience.

CICS SYSTEM PROGRAMMER
Salary $28,000 to $35,000. CICS and DMS maintenance using SMP, table maintenance and CICS training; analyze CICS program and system dumps.

Associated Grocers offers a comprehensive medical program and other excellent benefits. Please send resume to:

ASSOCIATED GROCERS OF ARIZONA, INC.
Attn: Personnel Manager
624 South 25th Avenue
Phoenix, Arizona 85009

Equal Opportunity Employer

PROGRAMMER/ ANALYST-

Fortune 500 company is searching for several 3+ years PL/1 IMS applications programmers. Company running IBM 3033's and 3081's. Company is looking for ACP type programmers also. Excellent relo. pkg. and benefit pkg. $30K plus. Fee Paid.

ROBERT HALF OF OKLAHOMA, INC
8846 S. Memorial #217
Tulsa, OK 74145
(918) 627-1600

COMPUTERWORLD CLASSIFIEDS

Advancements are constantly being made in the fast-paced computer industry. As a result, businesses are also progressing very rapidly. And many of them depend on COMPUTERWORLD Classifieds to keep them on top of their ever-changing needs. Broad coverage and quick solutions make COMPUTERWORLD the #1 computer trade newspaper in which to advertise. If you haven't already advertised in COMPUTERWORLD, why not become a part of our success and the success of many businesses like yours?

Our classifications include **Position Announcements, Buy Sell Swap, Software for Sale, Time & Services, Real Estate, Business Opportunities** and **The Bulletin Board.**

We'll keep you in step with progress.

Call us at 1-800-343-6474
In Massachusetts, call (617) 879-0700

HP-3000

PROGRAMMERS & ANALYSTS

We have several opportunities across the country for Programmers and Analysts experienced with the Hewlett Packard 3000 using the IMAGE data base language. Our client companies include both end-users as well as software development firms specializing on the HP-3000. A minimum of one year experience is required.

For additional information regarding these positions, call Mr. Lee Martin:

(804)490-3968 or
Forward Resume to:

Fortune

Personnel Consultants
of Virginia Beach
510 South Independence Blvd.
Virginia Beach, VA 23452

Looking for challenge and opportunity
GREAT PLAINS
Growing Companies
NEED: DP PROFESSIONALS

SYSTEMS PROGRAMMER
PROGRAMMER ANALYST
Programmer

- 3 Yrs. Experience
- IBM Environment Preferred
- Multiple Positions and Types Available
- Employer Fee Paid Only

CONTACT: JOAN OR CHUCK DUMMER

Dunhill
of KEARNEY, INC.
3720 Ave. A Suite B
Kearney, NE 68847
(Call Collect) (308) 234-4555

COMPUTER SCIENCE MATHEMATICS

Anticipated rank would be at Assistant Professor level. Starting date: August 15, 1983. The subjects of COBOL, programming, structured programming, data structure, machine organization and IBM 370 Assembler should be within the expertise of the applicant. The successful applicant should be able to teach all of the usual lower division mathematics courses. Minimum qualifications: A Masters Degree in Computer Science or Mathematics, Ph.D. preferred, and the ability to teach the above mentioned courses.

Applications should include an appropriate resume, a list of references and transcripts of all college work. A confidential placement file is welcome. Applications must be received by June 30, 1983. **Please address inquiries to: Dr. Ronald D. Clark, Chair, Division of Science and Mathematics, New Mexico Highlands University, Las Vegas, NM 87701.**

MMHU is an AA/EO employer.

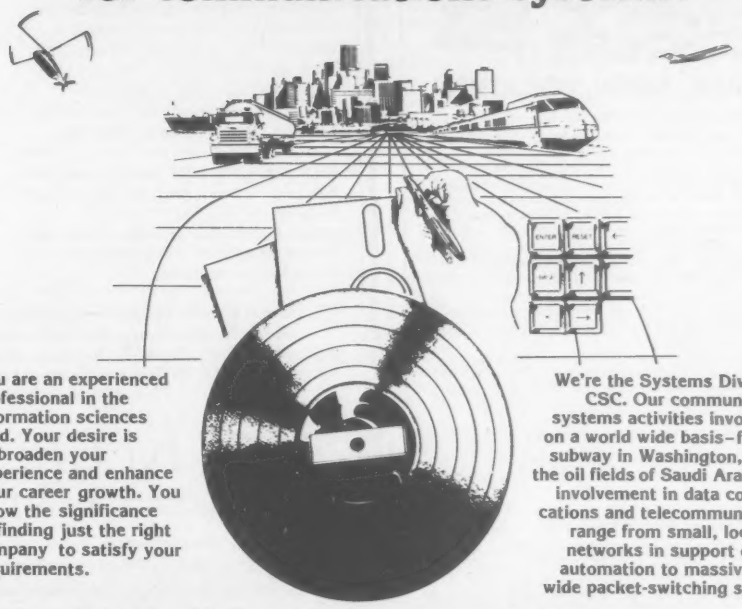
MGR. MIS AND ACCOUNTING

Major financial institution is seeking experienced Systems Analyst-/Project Leader to manage and develop MIS and accounting system for worldwide communications network. Salary low $40's. Send resume to:

CW-B4156
Computerworld
Box 880
Framingham, MA 01701

COMPUTER SCIENCES CORPORATION...

Involved in all aspects of software, hardware and systems engineering for communications systems.



You are an experienced professional in the information sciences field. Your desire is to broaden your experience and enhance your career growth. You know the significance of finding just the right company to satisfy your requirements.

We're the Systems Division of CSC. Our communications systems activities involve jobs on a world wide basis–from the subway in Washington, D.C. to the oil fields of Saudi Arabia. Our involvement in data communications and telecommunications range from small, local-area-networks in support of office automation to massive, world wide packet-switching systems.

We have designed and built communications systems that involve the most advanced technologies. Because of our continued growth in these areas we have immediate openings in COMMUNICATIONS PROTOCOLS DESIGN AND DEVELOPMENT, TRANSMISSION SUBSYSTEMS, HARDWARE SIZING, SELECTION, ACQUISITION AND INSTALLATION, VAX 11/780 AND MICROPROCESSOR BASE SOFTWARE DESIGN AND DEVELOPMENT, SECURE COMMUNICATIONS SYSTEMS, AND MESSAGE PROCESSING. Our communications expertise spans a wide variety of applications including LARGE SCALE NETWORKS, INDUSTRIAL AUTOMATION, MASS-TRANSIT AUTOMATION, REAL TIME PROCESSING AND VOICE COMMUNICATIONS.

If you are interested in a company that offers multiple career paths and many avenues for upward mobility; a company whose people are always encouraged to learn new skills and seek out the project and work location that best suit their interest and career goals, find out more about your future with Computer Sciences Corporation.

Computer Sciences Corporation
Systems Division (MC 218 CW 5)
6565 Arlington Boulevard
Falls Church, VA 22046

CSC
Equal Opportunity Employer

COMPUTER SCIENCES CORPORATION

WASHINGTON, D.C.

IBM 38

Metro area organization seeks solid Programmer Analyst. Must have six months of RPG III and four years EDP. $30K

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave Ste 401
Washington, D.C. 20814
(301) 652-1900

MUMPS to $35,000

Major, prestigious medical center has opening for a Laboratory Progammer/Analyst to participate in implementing a Medical Laboratory Computing System. Experience in MUMPS, BASIC, or other Real-Time, Interactive or Data-Base Management languages desirable. Needs ability to interact with Scientific, Technical and Professional Users in a small team environment. Superior benefit package and growth opportunity. Send resume or contact:

Mr. John Gilbert
Cedars-Sinai Medical Center
P.O. Box 48750
Los Angeles, CA 90048
(213) 855-5529

Programmer Analyst

WE ARE A SMALL, aggressive Chicago Suburban division of a Fortune "500" company in need of an in-house Programmer/Analyst for IBM/34 with RPG II. Applicants MUST have experience in manufacturing and sales analysis applications. Be ready for a shirt-sleeves environment with plenty of challenge.

IN RETURN for your expertise we offer growth potential and a full range of benefits. Rush complete, confidential resume including salary history to: Personnel Dept., Adams Elevator Equipment Co., 5640 Howard, Skokie, IL 60077

equal opportunity employer m/f

TOP SECRET SYSTEMS SECURITY EXPERT

If you are looking for a new career challenge that will afford high visibility, allow you to fully utilize and enhance your creative talents while working with the newest state-of-the-art security system, look no further. This position offers a unique blend of technical and marketing support activities. Duties include presentations as well as customer interaction.

Our objective is to hire the FINEST IBM-MVS TECHNICAL TALENT as quickly as possible. Candidates will need to be more acutely prepared in their advanced specialties...and dedicated to helping others to achieve the same expertise.

At CGA, you have the opportunity to know everyone in EDP worth knowing, because our list of TOP SECRET client companies reads like the who's who of the business world.

If you have a good understanding of MVS concepts and facilities, and you fit the above qualifications, an excellent salary and benefits package awaits you along with career opportunities second to none. Please send your resume and salary requirements to:

Al DeVito
CGA COMPUTER ASSOCIATES
Cannon Hill Farm
Rte. 520
Marlboro, NJ 07746

HP-3000/64 & 44 Sr. & Staff Programmer/Analysts

Wickes, a multi-billion dollar retailer/manufacturer is expanding its Santa Monica based Corporate Information Services Department creating additional opportunities for professional Programmer/Analysts experienced in business/financial applications and interested in the most advanced systems support/development.

We Offer:

- state-of-the-art HP hardware/software support
- Challenging professional work environment (on-line applications, structured design/programming, custom systems development)

Qualified candidates will posess a minimum of 4 years programming experience including 1-2 years of recent HP-3000 experience and a strong knowledge of COBOL,IMAGE, & VIEW. Salary will range to low thirties.

For confidential consideration, send your resume or a letter outlining your work experience to:

Wickes Companies, Inc.
Dept. CIS
P.O. Box 4056
Santa Monica, CA 90405

Equal Opportunity Employer
Only applicants responding in their own behalf will be considered

COMMITMENT TO EXCELLENCE

Cray Research today stands alone as the industry standard in supercomputers. Our dedication to technical superiority has resulted in steady growth since our founding a decade ago, and has created an atmosphere in which professional careers can achieve dimensions unmatched anywhere else.

Right now, we have several openings for professionals who can match their backgrounds to our requirements:

CRAY RESEARCH, INC.

Computerworld CAREER JOB FAIR

ST. PAUL, MINN. LOCATION

Sr. Programmer Analysts

- Software Development. Prefer a minimum of 2 years experience with UNIX operating system or C compiler development.
- Operating systems development. Responsible for design and development of projects such as resource scheduling and interactive processing. Five years large scale operating systems experience using assembly language.
- Software testing for product set software. Two years of independent software testing experience desired. Knowledge of FORTRAN or PASCAL and good communication skills necessary.
- Software testing for Cray operating system and system utilities. Minimum of 5 years operating systems development or testing experience.
- Field liaison/support. Responsible for installing and supporting our station software services logically linking front ends with Cray equipment. Minimum of 3-5 years large scale operating systems internals support or development experience required. Up to 30% travel.

Diagnostic Programming Manager

- Manage DIAGNOSTIC PROGRAMMING group. Previous management and diagnostic programming experience is essential.

Mechanical CAD/CAM Engineer

- CATIA/CADAM type design systems experience is required, as is ability to write FORTRAN code and integrate large distributed software systems. IBM/MVS/TSO experience is required. Some overseas travel.

Aerodynamic Flow Analyst

- Good theoretical knowledge of fluid dynamics and computational aerodynamic techniques is required for this position involving development and maintenance of existing and new aerodynamic flow codes. Aerospace industry experience is highly desirable.

CHIPPEWA FALLS, WISC. LOCATION — We are looking for the following experienced hardware professionals:

- CAD ENGINEER
- CIRCUIT DESIGN ENGINEER
- IC PROCESS ENGINEERS
- IC FACILITIES ENGINEER

Meet with us at the Business People Inc./Technical Job Fair, on Monday and Tuesday, May 16 and 17, at the Sheraton Hotel in Anaheim. If you are unable to meet with us at the job fair, please forward your resume in confidence to:

Elisabeth C. Wierum
Department 516
CRAY RESEARCH INC.
1440 Northland Drive
St. Paul, MN 55120

An Equal Opportunity Employer M/F/H/V

The Supercomputer People

Gate Array Specialist

Computer Manufacturing—U.K. Based

Our client, a major computer, telecommunications system and peripheral manufacturer, possessing an enviable international reputation, now seeks to appoint a Gate Array Specialist.
Based in an attractive semi rural United Kingdom location, having first class housing, educational and leisure facilities, the post will appeal to a science graduate, aged 22-30, who possesses the ability to translate and implement design requirements on to Silicon. A thorough knowledge of Gate Array equipment and procedures is essential.

Though based in the United Kingdom, some overseas travel is envisaged. Long term career prospects are excellent, including involvement with new ventures and project development. This is a career opportunity affording the successful candidate the chance to become totally involved in advanced technology and expansion.
The remuneration package is attractive and offers full family relocation to the United Kingdom, plus the comprehensive range of benefits associated with a major employer.

Interested male or female candidates (including U.K. citizens) should, in the first instance, forward a comprehensive resumé including photograph to:- David N. Johnson quoting Ref. No. 4006 The Recruitment Partnership, 27/28 Blackwellgate, Darlington, DL1 5HX, United Kingdom. Tel: (0325) 55426. Telex: 587259.

THE RECRUITMENT PARTNERSHIP

London, Macclesfield, Middlesbrough, Colorado (USA), Alexandria (Egypt).

In association with the Jackson Taylor International Group.

CURIOUS ABOUT CLASSIFIEDS?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We'll be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we'll send a demo paper which actually shows examples of ad sizes, typefaces, and prices. **Our toll free number is 800-343-6474, in Massachusetts call 879-0700, just ask for Classified Advertising.** Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. We're at 375 Cochituate Road., Box 880, Framingham, MA 01701. Send attn: Classified Advertsing. We're anxious to help!

BANKING HOGAN SOFTWARE I.D.M.S.

Come, grow with us! CTG is still expanding – Now over 1000 staff members with branch offices in 20 locations – We are still growing – are you?

If you have at least 5 years experience in any of the above and need a new challenge, CTG may be your answer.

Invest some time – talk with the leaders – rush resume with preferred locations, today, to:

John DeDeyn
Computer Task Group
800 Delaware Avenue, Buffalo, New York 14209

CTG

No employment agencies, please... CTG is not an employment agency.

EQUAL OPPORTUNITY EMPLOYER M/F

RETAIL SYSTEMS ANALYSIS

Expansion of our corporate Management Information Services Department to Santa Monica has created outstanding job opportunities for:

Project Leaders
Senior Programmer/Analysts
Programmer/Analysts

experienced in large IBM mainframe installations and retail systems support.

We are seeking professionals who possess a minimum of 5 years background in OS/MVS, CICS, JCL, structured COBOL programming/analysis and exposure to retail and manufacturing environments to work closely with our western-based divisions as well as with corporate headquarters.
We offer:

- **Competitive Salaries • Comprehensive Benefits**
- **Challenging Professional Work Environment**

For confidential consideration, send your resume and salary history to:

Wickes Companies, Inc.
Dept. MIS P.O. Box 4056
Santa Monica, CA 90405

Equal Opportunity Employer
Only applicants responding in their own behalf will be considered.

IBM
SUNBELT CAREERS
P/A, S/A, DBA
IMS or CICS EXP. REQ.
SYSTEMS PROGRAMMERS
MVS, VM, DOS,IMS or CICS EXP.
All positions fee paid.
Call or send resume today.
Our 14th yr. as recruiters
Pam Spears, CPC

TOLL FREE
800-334-4220
IN NC (919) 484-4101

NATIONWIDE PERSONNEL SERVICE INC
P.O. Box 35925
Fayetteville, N.C. 28303

You Would Like The
MAINE LIFESTYLE

We have needs for MVS Programmers. Also IBM System 38, 4341, 3081, 3083, COBOL, RPG II, III. Several openings - manufacturing/financial. 1 year experience a must.

Contact in Confidence:
Executive Search of N.E., Inc.
3 Canal Plaza
Portland, ME 04112
(207) 772-4677

position announcements | position announcements | position announcements | position announcements | position announcements

MGR. NETWORK SOFTWARE AND PROTOCOLS

Major financial institution is seeking experienced Communications Analyst/Programmer to develop and test software sub-systems for worldwide communications network. Knowledge of X.25, ISO standards a must. Salary low $40's. Send resume to:

CW-B4158
Computerworld
Box 880
Framingham, MA 01701

COMPUTER PROGRAMMER AND DEVELOPER OF APPLICATIONS SOFTWARE

Hours: 9 - 5, 40 hr. week. To design, develop and program computer applications software for Timex-Sinclair and Spectrum computers. Must have knowledge of Basic and Machine Code computer languages, write technical instructions and literature for applications software, assist in sales and marketing of our computer software. Must have minimun six months computer training course and three years experience in Timex-Sinclair and Spectrum applications software programming and development. $350/wk. Call: (212) 685-2080.

COMPUTER AND MANAGEMENT SCIENCE: Department head position available summer or fall 1983. Department has over 200 majors in degree programs similar to DPMA/ACM/AICPA business-oriented recommendations. Computing facilities include a one megabyte Burroughs 1955/1905 combination, RJE to an Amdahl 470/V6 and Apple, TRS-80 and IBM micros. Doctorate preferred; masters required. Salary and rank dependent on qualifications and experience. Closing date June 15, 1983 or until filled. Send resume and three letters of reference to: Dr. Jack Hamm, Dean, School of Systems Science, Arkansas Tech University, Russellville, Arkansas 72801. An equal opportunity/affirmative action employer.

SYSTEMS CONSULTANT UTILITITY COMMUNICATION INDUSTRY

Due to growth in our sucessful systems consulting division, we require an experienced MIS individual to consult with our communications clients in virtually all areas of information systems. Telecommunications industry experience would be highly desirable. Limited travel required from a central midwest location (not Chicago). Opportunity to participate in the firm exists based on performance. Professionalism, oral/written communication skills, stable work history and relevant academic preparation are required. Please send resume or letter of interest to:

Partner in Charge - Consulting Division
Reply to CW-B4182
Computerworld
Box 880
Framingham, MA 01701

EDP OPPORTUNITIES
New England/Nationwide

Outstanding opportunities exist in NEW ENGLAND and NATIONALLY for Project Leaders, Systems Programmers, Systems Analysts, Programmer Analysts, Software Engineers with two plus years experience. Call or write today in total confidence:

KUEBLER ASSOCIATES
Data Processing Division
Two Monument Square
Portland, ME 04101
(207) 774-9100

PROGRAMMER/ANALYST
IBM System 38

EMS, the outdoor specialists, are seeking an experienced programmer/analyst, preferrably with retail or direct marketing/mail order background. The successful applicant will have at least 3 years of coding RPG II or R²G III, with system 38 or system 34 exposure in an interactive environment. We offer competitive salary, an excellent benefit package and a pleasant work environment. Please send resume with salary history in confidence to:

J. Dunlop, Personnel Director
EMS
1 Vose Farm Rd.
Peterborough, NH 03458

An Equal Opportunity Employer
A Division of Franklin Mint Corp.,
A Warner Communications Company.

TECHNICAL MGR. Suprv. computer operations. Train staff in computer applications. Debug & enhance existing software when necessary. M.S. in Comp. Sci. or Educ. Tech. Must know BASIC; must speak Chinese. $22,000 per yr. to work 40 hrs./5 days/wk. **PLEASE SEND RESUMES Valley View Farm, 119 Chrystie St., NYC 10002**

TECHNICAL SUPPORT CENTER ANALYSTS

Acknowledged as the world leader in the computer-driven Office Automation market, Wang today stands #264 on the Fortune 500, with continued sales revenue growth of over 30%. And that's still only just the beginning.

Continued growth within our Technical Support Center has created opportunities within our Communications, Computer Systems, Office Systems and Professional Systems Groups. A vital information link to Wang field analysts worldwide, the Center represents a corporate-wide commitment to provide support for the full Wang product line. Activities include telephone and on-site assistance and consultation working with the best team in the industry with state-of-the-art products.

Communications Group

Requires current hands-on experience in state-of-the-art communications. Some experience in software support with a computer or communications vendor, or large user, is desirable. Additional assets are experience with data scopes and modems, and knowledge of various telecommunications products and interfaces.

Computer Systems Group

Requires a firm understanding of information processing concepts with practical experience in at least one of the following: COBOL, Assembler, FORTRAN, BASIC, RPG II, PL/1. Knowledge of Wang VS systems, data communication and database systems experience highly desirable. Good verbal communications skills required.

Office Systems Group

Requires a solid grasp of office automation and information processing concepts with practical experience in at least one programming language, preferably BASIC. Knowledge of Wang systems, software support experience, and strong communication skills required.

Professional Systems Group

• Professional Computer

Requires practical experience with and a firm understanding of micro computers derived from related experience in development or customer support. Knowledge of TC protocols and networking environments desirable. Proficiency in BASIC, COBOL, PASCAL, or Assembler required. Good communication and analytical skills essential.

• 2200 Systems

Requires solid BASIC programming knowledge on an interactive mini computer or similar system, with minimum of 2 years' experience in DP support or development. Knowledge of Wang 2200 systems an asset, familiarity with Wang IDEAS program generator application desirable. Good communication and analytical skills required.

Leading the way in benefits.

Wang offers one of the best benefit programs in the industry including profit sharing, stock plans, company paid dental, medical and life insurance, tuition reimbursement, our pace-setting child day care center and employee country club.

Contact us today.

Send resume with salary history to Kevin E. Mahoney, Wang Laboratories, Inc., Dept. CW-5/16, M/S 14A2B, One Industrial Avenue, Lowell, MA 01851.

We are an affirmative action employer.

WANG

Office Automation Computer Company

Successor Planning
Executive Selection
Europe

Your management's decision on who will supervise your investment in Europe is essential to successfully marketing products and services here.

The input you receive from your people at country and European level will determine the quality and success of many of your strategies; the input your European employees receive from their local managers will determine their level of involvement in the future of your company.

It is almost impossible to over-emphasize the importance of finding the right person for a given position. Identifying management talent in Europe's high technology industries is our business.

Since 1969 we have assisted both American and European companies to staff almost 1000 key management functions with experienced, result oriented executives. Below are examples of:

Positions filled	High-tech. branches served
Regional Vice President ● General Manager ● Controller ● Marketing/Sales/Product Managers ● F. & A. Manager ● Software Manager ● Systems Software Support ● Customer Engineering ● Branch Office Manager ● Advertising ● Personnel ● General Council ● Auditors ● Public Relations	VLSI - Mainframers ● Plug Compatable ● MINIS ● MICROS ● Small Business Systems ● Printer/Word Processor Manufacturers ● Data Comm. ● Packsaged Software ● Systems Houses ● EDP & Management Consultants ● CPA Firms ● Time Sharing ● Computer Services ● Data Center ● EDP Users

If successor planning or staffing your European organisation requires professional attention please contact us for the lion's share of your staffing questions. Video interviews of canditates screened to your specifications as well as guarantees for the success of both the search and the selection process are a few of the many advantages you have with Dolan Consulting.

Representatives of our company will attend the NCC in Anaheim in May. Please arrange for on appointment now or call us when you are in Europe next.

DOLAN CONSULTING
Human Resource Management
Untermainkai 34 · 6000 Frankfurt/M. 1 · Telefon (611) 23 08 76
for the lion's share of staffing questions
Germany · Austria · Switzerland

INVEST YOURSELF.

If you're taking stock of your talent and experience, then take a look at FLORIDA POWER CORPORATION. At Florida Power, we value the blue chip individual. The person with dreams and the drive to realize them. We currently have the following positions open:

SENIOR QUALITY ASSURANCE ANALYST

Bachelor's degree with a major in Accounting or Computer Science. 7 years computer-related experience, including system design/development and a working knowledge of 3 programming languages is required. Good communications and general business skills also required. EDP quality assurance or EDP auditing experience is highly desirable for this position. Experience with Systems Development Methodology a plus. Professional certifications such as CIA, CPA, CDP are preferred.

Responsibilities include the review of the finished products of CSD against established standards for quality and control. This person will coordinate scheduling, reviewing and reporting activities of quality assurance evaluations and quality review boards. You'll maintain and improve, through recommended revisions, the division standards, procedures and guidelines which impact the quality of systems and services.

DATA SECURITY ADMINISTRATOR

Bachelor's degree and 9 years related Data Processing experience with at least 3 years in systems development on large scale computers required. High degree of technical knowledge in data security and disaster recovery also required. A minimum of one year's experience working with ACF2 is required.

Find exceptional benefits, competitive salaries and a year-round family oriented lifestyle with a cosmopolitan setting. We challenge and reward professionals.

So Invest Wisely. Invest Yourself. Send your resume and salary requirements, in confidence, to:

Terry Edwards
Professional Staffing Supervisor
FLORIDA POWER
CORPORATION / Section 145
3201 34th Street South, Bldg. D
St. Petersburg, FL 33733

Florida Power CORPORATION

EOE U.S. Citizenship Required.

Sales

SOFTWARE SALES REPRESENTATIVES

Washington, D.C. • New York
Philadelphia • Los Angeles
Chicago

Over the past five years, Martin Marietta Data Systems has been registering growth rates of better than 25% per year - providing total information solutions, DP services, "off the shelf" and user-specific software systems to a wide variety of organizations.

To join our winning sales team, you must be an aggressive, self-motivated sales professional with at least 3 years' experience in the marketing of software systems. Ideally, this will include sales of business applications packages and consulting services. Additional experience in selling integrated systems is also desirable.

For immediate consideration, please call P.H. Shockley at (301) 982-6697, or send your resume to Martin Marietta Data Systems, 6305 Ivy Lane, Greenbelt, MD 20770.

MARTIN MARIETTA

An Equal Opportunity Employer
Principals Only

IDMS PROFESSIONALS

Florida Coast Location

Harris Government Systems Sector, a communications systems designer for a variety of government applications, with over $1.2 billion in sales, 7,000 employees and a strong growth record, seeks talented MIS personnel with experience in IDMS Data Base Management System.

IDMS DATA ADMINISTRATION MANAGER

We seek a Manager with 5 or more years previous management experience with IDMS Data Base in data administration. You will provide technical direction for DB/DC functions in support of Software Development and for maintenance of production systems. You will also conduct R&D activities on new DB/DC technologies. BSCS required. MBA preferred.

IDMS PROFESSIONALS

We seek qualified IDMS Professionals for the development of on-line data base systems for finance/accounting/manufacturing and material management application. Technical expertise in ANS/COBOL, MVS JCL and high level language such as FOCUS and IDMS ADS/on-line beneficial. You must have the ability to interface effectively with users and experience in a project-team environment.

We are part of the Harris Corporation, Florida's largest industrial employer, located in a Florida East Coast resort area, where you will earn nationally competitive income and excellent benefits while paying no state or local income taxes—and enjoy the lower cost of Florida living.

For consideration, please forward your resume in confidence to: Julian Kaufmann, Harris Government Systems Sector, P.O. Box 37, Melbourne, Florida 32901.

HARRIS

An Equal Opportunity Employer, M/F/V/H.

MOVE AHEAD WITH COMPUTERWORLD

More computer people read Computerworld than any other newspaper in the United States—more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

SOFTWARE PROFESSIONALS

TANO CORPORATION is committed to bringing creativity and ingenuity to its products which include the industry's most sophisticated marine and industrial supervisory control, energy management and data acquisition systems. Our continued expansion offers new opportunities to Software professionals.

SENIOR SYSTEMS ANALYST

Provide technical and administrative leadership to software projects. Candidates must possess relevant degree and 3-5 years experience in real-time data acquisition and control systems. Applications include liquid or gas pipeline systems, energy management, process control. Motorola 680X, RSX11-M or VAX experience helpful.

SYSTEMS ANALYST/SPECIALIST

Design software products and custom systems. Candidates must possess relevant degree and minimum of 2 years experience in real-time software development. Data acquisition and control, process control. Motorola 680X, RSX11-M, VAX preferred.

TANO CORPORATION offers an excellent compensation and benefit package, including 100% Company-paid medical insurance, incentive plan and pension trust. Please telephone to present qualifications, or submit confidential resume to:

(504) 254-3500
Personnel Recruitment Department

TANO

4301 Poche Court West
New Orleans, Louisiana 70129
PRINCIPALS ONLY
Equal Opportunity Employer M/F/H

SOUTHEAST

Client Position Open In:
MFG., ENGG., INS., & MED.
Using
IBM, BURRS., H'WELL, DEC, & ETC.
IMS, IDMS - Helpful.
Need
S/A, P/A, Prog., Sys. Prog., DBA, also Facility Resource Analyst exp. in cap. planning & scheduling.
Mail resume or call collect:
(803) 233-2546
Chris Scott or John Couch
Excel Personnel
26 W. Airlie Drive
Greenville, SC 29607

FACULTY POSITION
HEIDELBERG COLLEGE
TIFFIN, OH

To teach both beginning and upper level undergraduate courses. Master's degree required.

Teaching Emphasis
Small College
Excellent Equipment
Active Curriculum

Resumes should be sent to: Dean Preston Forbes, Heidelberg College, Tiffin, OH 44883. Applications accepted until position is filled. Heidelberg College is an Equal Opportunity Institution.

position announcements | position announcements | position announcements | position announcements | position announcements

INSTRUCTOR - Data Processing
Full-time continuing position available fall term for an individual to teach courses in data processing which may include basic computer concepts, ANSI COBOL and COBOL/CICS case study. Minimum qualifications include a Bachelor's degree and 3 years of full-time work experience as a systems analyst-/programmer with experience on an IBM 360, 370, or 4300; proficiency in ANSI COBOL, CICS, DOS/VSE or OS, and ICCF or equivalent. Experience with assembler language, BASIC, data base, RPG II and related teaching experience desirable. Starting salary range is $16,368 - $20,877. Send letter of intent and detailed current resume before the application deadline date of 6/17/83 to Personnel Division, Lakeland Community College, Mentor, OH 44060. An Equal Opportunity/Affirmative Action Employer.

SENIOR OPERATIONS RESEARCH ASSOCIATE. Research and applications of state-of-the-art management science and operations research methodologies to transportation problems. Design and development of sophisticated computer systems and mathematical models that support the application of such methodologies. Making formal presentations to clients. Must have M.S. in Operations Research and be conversant with computer and computer programming. Forty hours per week, Monday through Friday, 8:30 a.m. to 5 p.m. Salary $30,000 per year. Apply with resume to Ohio Bureau of Employment Services, 3135 Euclid Avenue, Cleveland, Ohio 44115. Attention: Mildred McGill. Job order number 0235574.

DATA PROCESSING COORDINATOR

Brookings Municipal Utilities is seeking an individual to fill the position of data processing coordinator to oversee the installation of a computer system and thereafter to be in charge of coordinating all data processing and development activities. Brookings Municipal Utilities operates electric, telephone, water and wastewater utilities and will be implementing automation of utility programs later this year. Qualifications preferred are: Knowledge of computer hardware and programming and experience in system operations. Salary in low to mid $20's. **Send complete resume and salary history to: GENERAL MANAGER, BROOKINGS MUNICIPAL UTILITIES, BOX 588 BROOKINGS, SD 57006**

MOVE STAY SOUTH NOW!

Our computer can help you get here or stay here. Four WATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

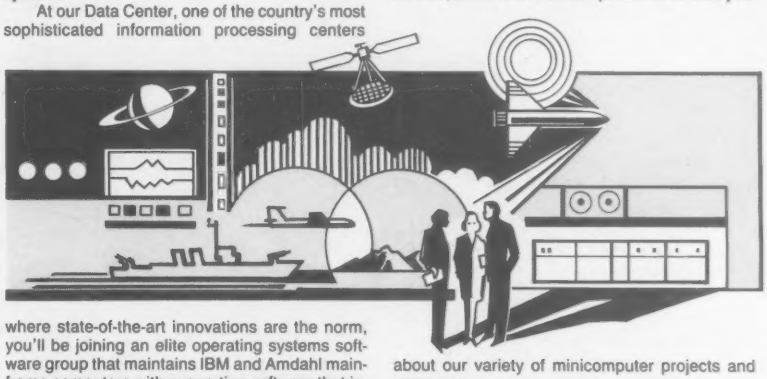
DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 13730
Pensacola, Florida 32596-1373
CALL TOLL FREE (800) 874-2407
IN FLORIDA (904) 434-2321 COLLECT

Computer Software Engineers/ Systems Programmers

Many things fly, maneuver and run on software at Kearfott. Including careers.

Whatever your software specialty, you have a choice of career paths at Kearfott—in operating systems...commercial applications...and computer software engineering. Right now we're engaged in many of the most difficult, stimulating, and ultimately rewarding technological undertakings imaginable. And all of our dozens of on-going projects depend on strategic software advances in communications, logistics, MIS and guidance systems.

At our Data Center, one of the country's most sophisticated information processing centers



where state-of-the-art innovations are the norm, you'll be joining an elite operating systems software group that maintains IBM and Amdahl mainframe computers with supporting software that includes MVS/SP3, JES2, IMS DB/DC, CICS, WYLBUR, TSO ACF/NCP, ACF/VTAM, GDDM, and numerous compilers and program products. This Center is tied into all our plants via communications links and provides an instant interchange of technical data. Here you'll have the opportunity to support user-friendly software and microcomputers and become involved with educating company users and consulting on, and resolving, daily problems.

In MIS—the expanding sphere that has helped give Kearfott's rarefied environment a very solid basis—you'll run the gamut. Accounting. Finance. Payroll. Inventory and manufacturing controls. All involve COBOL programming, CICS, MVS, IMS, and data base design and Telecommunications.

Software engineering offers yet another challenge. Have strengths in realtime software development? Simulation or validation techniques? Firmware and microprocessors? Kalman filtering? Fortran, JOVIAL or Ada compilers? Let us tell you about our variety of minicomputer projects and resources.

The path of the future for software professionals can begin with Kearfott if you have the minimum of 3 years experience that we require in a large-scale IBM system, with HP, DEC, or airborne minicomputers or microcomputers in realtime military systems.

Find out why software careers fly higher at Kearfott by sending your resume to: E.J. Murphy, Singer Company, Kearfott Division, 1150 McBride Avenue, Little Falls, NJ 07424. U.S. Citizenship required.

Kearfott
a division of The SINGER Company

An equal opportunity employer, m/f, who creates opportunities

University of Alaska
Director of Administrative Computing Services
(Search extended)

The director of administrative computing services will be responsible for the development and/or enhancement of new administrative computer systems as well as maintenance and/or enhancement of current administrative computer systems. Based in Fairbanks, the director will supervise a staff of analysts/programmers to accomplish the above while maintaining documentation and programming standards.

The University of Alaska is acquiring new administrative hardware and software. The successful applicant will have the opportunity to build new systems for a multi-campus university. The successful candidate will have considerable experience in the development of administrative computer systems as well as supervising experience.

Closing date May 30, 1983. Applications should be submitted to the following address:

Mr. William L. Clark
Assistant Vice President for Computing Services
107 Bunnell
University of Alaska
Fairbanks, AK 99701

The University of Alaska is an AA/EO Employer and Educational Institution. Your application may be subject to public disclosure if you are a finalist for the position.

PROGRAMMERS
PROGRAMMER/ANALYST
SYSTEMS ANALYST
SYSTEMS PROGRAMMERS

We currently have 450 Data Processing openings in NC, SC, VA, TN and GA. We represent the best clients in the "sunny south". Let us match what you want with top companies needs.

Call collect: Jan Blethen, CPC or Chip Groome, CPC (919) 584-5591.

"THE D.P. PROS"

Personnel Placement, Inc.; 537-D Huffman Mill Road; Burlington, NC 27215.

SEMINARS

PUBLICATIONS

NORTH CAROLINA

If you qualify for positions in the $20,000 to $40,000 range, contact us in total confidence concerning opportunities in the Carolinas. We specialize in Data Processing professional placement. Our clients pay our fees and provide relocation assistance.

ROMAC.
2000 W. First Street (-C)
Winston-Salem, North Carolina 27104
919-725-1233

UNIX TRAINING

DALLAS, HOUSTON, AUSTIN, NEW ORLEANS
Advanced Computer Seminars
2915 LBJ Freeway
Suite 161
Dallas, TX 75234
(214) 484-UNIX

FREE-LANCE PROGRAMMING

Join the **Nat'l Association of Free-lance Programmers (NAFLP)** and receive NAFLP's monthly **SOFTWARE MARKET LETTER.** Learn how and where to sell your software and get programming contracts. All subjects wanted: include games, professional, personal and hobby. NAFLP has the most complete and current lists of software buyers including software publishers, distributors, publishers, computer service bureaus, consultants, computer manufacturers, periodicals and others. Articles and news items show you how to get your share of the high royalties being paid. Join now. Membership $48.00 year. Send check or MC/VISA number and expiration date to:

NAFLP
Box 513A, Vienna, VA 22180
(703) 938-9191

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

BUY•SELL•SWAP

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & components
12605 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/750, 11/780, H7112-A, H9602-DF, RP06

WE ARE SELLING:

11/780-CP
MS780-DC
MS780-CC
FP780-AA
DW780-AA
H7100-A
H9602-HA
RH780-AA
MS750-CA
FP750-AA
RH750-AA

DEC 2060 SYSTEM

If you want on our Mailing List, call Valerie (713) 451-3112.

WANTED

SCAN-OPTICS 530

Model II

Including

1 Video Display
Keyboard
Printer
2 Tape Units

Call: (513) 224-6560

NEW USED

UNBEATABLE PRICES

T.I. Specialists*

ADDS
DEC
DIABLO
HAZELTINE
QUME
TELEVIDEO
TEXAS INSTRUMENTS

TO 50% DISCOUNT

THE COMPUTER BANK
315 Rte. 110, Hunt. Sta., New York 11746
(516) 549-5500
* Printers, Systems, Terminals, VDT's

BUY ■ SELL ■ LEASE
PURCHASE / LEASEBACK

All IBM Equipment

Call FREE 1-800-527-6438
FRONTIER®
COMPUTER CORPORATION
4575 S. Westmoreland • Dallas, Texas 75237
214-330-7243

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS, DATA MODULES, MAG. TAPE, DISKETTES

SALE OR LEASE

machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557—3330—3340

disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5633 W. Howard St. Chicago, IL 60648
800-621-3906 312-647-0880
Authorized Distributor—Memorex, CDC, 3M, BASF, Verbatim

AMERICA'S LEADER IN BURROUGHS EQUIPMENT
NOW OFFERS
OVER $2,000,000
IN OWNED
BURROUGHS EQUIPMENT
FOR IMMEDIATE DELIVERY
B1800 - B7800
ALL MEMORY, DISK, TAPE,
MT's, TD's, PRINTERS
GUARANTEED BURROUGHS MAINTENANCE
602-264-5151
COMPUTER MARKETING CORPORATION
5651 NORTH SEVENTH STREET
PHOENIX, ARIZONA 85014
TLX 165-712
MEMBER COMPUTER DEALERS & LESSORS ASSOCIATION

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

BUY
SELL • LEASE

DISK
3340 • 3344
3350 • 3380

TAPE
3411 • 3410
3420

Call Bob Ford
or Nelson Johnson

S/38
S/34
S/3
SERIES/1

Call Gayle Drotar
Roger Odom
Ken Winzen

370 Systems

4341 • 4331
3031 • 3032
3033 • 3081

Call Jack Harvey
or John Bottom

NEED TO REDUCE EXPENSES?

ECONOCOM'S PURCHASE-LEASEBACK PROGRAM CAN PRODUCE IMMEDIATE SAVINGS ON YOUR PRESENT EQUIPMENT—CALL FOR DETAILS.

ECONOCOM
845 Crossover Lane
P.O. Box 240297
Memphis, Tennessee 38124
901-767-9130
CDLA

COMDISCO®

Your First Choice ☑ In The Second Market

IBM PROCESSORS		IBM PERIPHERALS	
☐ 308X	36-60 Month Leases (ITC Lessor or Lessee)	☐ 3880/3830	Immediate Availability
☐ 3033	Available for lease or sale now	☐ 3380/3375	Immediate Availability
☐ 3032	Available for short term lease	☐ 3350/3370	Immediate Availability
☐ 3031	Available for lease or sale now (along with A/P's)	☐ 3803/3420	Immediate Availability (All models)
☐ 4341	We're Buyers, Sellers and Lessors of Group I's and II's	☐ 3800 3704/3705	30-day Availability
☐ 4331	Group II's available for lease or sale	☐ 3811/3211	Immediate Availability
☐ Memory/Channels	available for 303X, 4300 and all 370's	☐ 327X	We're Buyers, Sellers and Lessors

We Can Put It Together

Eastern Regional Headquarters	
(Connecticut)	203/655-1211
New Jersey	201/568-9666
Washington, D.C.	301/441-1000
Philadelphia, PA	215/545-8035
Boston, MA	617/542-4005
Midwestern Regional Headquarters	
(Chicago)	312/698-3000
Michigan	313/644-1500
Western Regional Headquarters	
(San Francisco)	415/944-1111
South Central Regional Headquarters	
(Dallas)	214/641-3255
Atlanta	404/256-5956
Florida	305/428-3177
Canadian Regional Headquarters	
(Toronto)	416/968-7135
International Headquarters	
(Chicago)	312/698-3000
Latin America	305/666-6258
Paris	01 524 5270
Switzerland	41 (21)71 09 35
West Germany	(2434) 5048
Corporate Headquarters	
6400 Shafer Court Rosemont, IL 60018	312/698-3000 TWX 910-253-1233

A MEMBER OF CDLA AND LISTED ON THE NEW YORK STOCK EXCHANGE

IBM 4331

Model J01 Processor - 1MB
(3) 3310
(1) 3370
(1) 3262
(2) 3278
(2) STC Triple Density Tape Drives.

Equipment on third party lease-company going out of business.

Call for details -
Mr. Faulkner (312) 263-4222.

Coastal Computer Marketing

IBM Equipment

BUY SELL LEASE

Herb Levy
Al Sheldon
(800) 221-4069
(213) 986-4830

WE DO BUSINESS WITH A SHARP PENCIL

No wonder our customers receive the right price and the right service at the right time!

COI "The best option" Computer Options, Inc.
3660 South Highway 100
Minneapolis, Minnesota 55416
Call us toll-free 800-328-5718. (In MN 612-544-8660.)

3083-E16
4341-L11
4341-M12

WANTED
4341 Grp 1 or 2
For Outright Purchase
Or Purchase-Leaseback
Short or Long Term

Tape Drives
3420
3410 8809
Immediate Delivery

Controllers
3880 3830
3803
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3340
3330 3310
Immediate Delivery

Printers
3287 3289
3203 3211
3262 1403
Immediate Delivery

Control Units
3274 3272
3276 3271
Immediate Delivery

Display Stations
3278 3277
Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

CDLA

Contact Bernie Gest 215-782-1010
Computer Marketing Inc.
7704 Seminole Ave., Philadelphia PA 19126

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

$mart idea. IBM products at a Dataserv price.

Dataserv can deliver more IBM equipment at lower prices and lower lease rates

Guaranteed.

Companies of every size are saving thousands, yes, even hundreds of thousands of dollars on their IBM equipment. How? By leasing and/or buying from Dataserv.

We're world-wide and we're stronger than ever and working harder than ever to *earn* your business. We specialize in new and used IBM computers — **Sys/34's, 38's, 4331, 4341, 3033, 3081, 3083 and all IBM peripherals.**

For immediate details on all the Purchase, Lease and Purchase/Lease Back plans offered by Dataserv call our toll free number.

"We made a decision several years ago to do business with Dataserv. Since then Dataserv has provided us with more than two million dollars worth of equipment. We have enjoyed excellent savings with every single transaction. Dataserv is a remarkable company and a good source for us."

Robert M. Horton, Sr. Vice President
Trusco Data Systems, a division of
The Trust Company of Georgia
Atlanta, Georgia

dataserv
509 Second Ave. So. Hopkins, MN 55343
TOLL FREE **800/328·6729**
In Minnesota call collect 612/933·2575

Lease · Sale · Purchase · Maintenance
Saving you money on your IBM investment

GETTING YOU DOWN?

SKY-HIGH PRICES

BUY · SELL · LEASE TRADE-IN

- FAS 13 Operating Lease IBM S/34, S/38, 4300
- RENTALS IBM 5224, 5225, 5251, etc.
- ALL Products Available Immediately!

CERES CAPITAL CORPORATION
New York: (212) 279-4467
Houston: (713) 627-7724

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

CLEARANCE SALE
DEC* NEW & USED

11/24	RL01	BA11KE
11/34	RL02	DD11DK
11/70	RM02	FP11A
11/44	RM03	FP750
VAX 730	RM05	DZ11A
		DL11W

ALL AT A FRACTION OF LIST PRICE

We BUY and SELL all DEC
CPU's•SYSTEMS•COMPONENTS
MEMORY•TERMINALS

CALL **800-854-0350**
In Calif: 714-632-6986 or 408-287-7338
DATALEASE sm
The DEC SPECIALISTS
P.O. Box 6086C
Anaheim, CA 92806

* Registered Trademark of Digital Equipment Corporation.

Terminal & Printer Sale
DEC Products

1.	VT100-AA CRT	$ 1325.00
2.	VT101-AA CRT	$ 995.00
3.	VT102-AA CRT	$ 1395.00
4.	VT1xx-CB Regis graphic option	$ 1495.00
5.	VT18X-AC Personal Computer Option	$ 1295.00
6.	VT180-AC Personal Computer	$ 2595.00
7.	LA100-AA KSR Terminal/Printer	$ 2295.00
8.	LA100-RA "RO" printer	$ 1795.00
9.	LA34X-SL Stand for LA100 printers	$ 95.00
10.	LA50-RA printer	$ 595.00
11.	LA12-A portable printer	$ 1995.00
12.	LA12-C portable printer	$ 1595.00
13.	LA12-D portable printer	$ 1495.00

C. Itoh Product

1.	CIT-80 (VT52 comp with port)	$ 895.00
2.	CIT-101 (VT100 comp with AVO/PP)	$ 1275.00
3.	CIT-101 (amber or green screen)	$ 1350.00
4.	CIT-301 (graphic option for CIT-101)	$ 1295.00
5.	CIT-161 (color VT100 comp)	$ 2495.00
6.	CIT-261 (graphic option for CIT-161)	$ 1495.00
7.	CIT-414 graphic CRT	$ 1795.00
8.	CI-300 300 LPM printer	$ 4495.00
9.	CI-8510 pro-writer	$ 595.00
10.	CI-1550 pro-writer	$ 845.00

All pricing is quantity one pricing. Quantity discounts are available.
Computer Systems Corporation
5840 Rock Hampton Ct
Indianapolis, IN 46268
(317) 872-7200

---

* SCHERERS * SCHERERS *

1000 MODEMS PLUS 1000 TERMINALS

DEC TERMINALS			TI PRINTERS	
LA50's	LA34's	VT100's	VT103's	810's
LA100's	LA36's	VT101's	VT131's	820's
LA120's	LA180's	VT102's	VT25's	850's

DF03-AA $495.00 — **DURING MAY & JUNE** — VA212LC $495.00

*WHEN YOU BUY A NEW OR USED TERMINAL OR PRINTER AT

SCHERERS LOW LOW LOW PRICES

you can then buy a Brand New 300/1200 Baud Bell Compatible 103/212A Originate—Auto Answer Modem for

$495.00 each

YOU DECIDE
Which Terminal & Which Modem
DEC DF03-AA — *495.00
OR
VADIC 212 LC — *$495.00

FOR MORE DETAILS CALL:

SCHERERS
6145 Scherers Place
Dublin, OH 43017
(614) 889-0810

SPECIALISTS IN:
DEC EQUIPMENT
TI PRINTERS

* SCHERERS * SCHERERS *

WE BUY, SELL, LEASE, RENT, PURCHASE/ LEASEBACK.

LARGE INVENTORY
CPU's, CRT's, PRINTERS
SHORT OR LONG TERM LEASES
MONTHLY RENTALS

3741/3742

IBM SYSTEMS **34 & 38**

Call BARRY TESSLER
KEN WARREN

Pearl Computer Division

P.O. Box 24026
4717 Centennial Blvd.
Nashville, TN 37202
Nashville:
(615) 383-8703
Houston:
(713) 675-7551

SELLING?

More than half a million active computer people read COMPUTERWORLD each week. That means:

- **YOU can reach them efficiently in COMPUTERWORLD Classifieds.**
- **YOU can find buyers for discs and DEC's, terminals and timesharing, software, System 370's, and more.**
- **YOU can join the THOUSANDS OF ADVERTISERS who use our classifieds because they get RESULTS.**

To place your ad, or to get a rate card with complete details on COMPUTERWORLD Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

SYSTEMS
4341 4331
38 34
32 3

BUY • SELL • LEASE

COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE

CB

TOLL-FREE
800-238-6405
901-372-2622

PERIPHERALS
3203 3370
3340 3411
3350 3420

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?

Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.

We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.

Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.

We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 18 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.

We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Senior Vice President, **800-243-5307.**

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION **RANDOLPH COMPUTER CORPORATION** *A subsidiary of* THE FIRST NATIONAL BANK OF BOSTON **BANK OF BOSTON**

ACM
214/385-0354
BUY-SELL LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals
- New systems available at substantial discounts

IBM P.C.
- Lease program for IBM personal computers

PIONEER COMPUTER MARKETING
4835 LBJ Frwy. Suite 680
Dallas, Texas 75234
214/385-0354

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM Computers and Peripherals

Home Office FOUNDED 1971
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta
404 953-9457
Dallas
214 934-9516

GDLR

The Market Leader in current used IBM
BUY • SELL • LEASE
SERIES 1
S/34 • S/38
S/23 • 5110 • 4300
All IBM and peripherals
XERXES COMPUTER SALES
1614 Harmon Place, Suite 210, • Minneapolis, MN 55403
800-328-3884 / 612-339-3042

IBM
Model 3101-22
$1,395
Limited Quantity
New Displays
In Original Cartons
ML&A Call Jerry or Alan Marshall Lewis & Assoc. (714) 641-0366

DATA GENERAL
We Buy, Sell And Service
New And Surplus Systems and Peripherals
Call Or Write
Hanson Data Systems
(outside Mass. toll free) 1-800-225-9216
(within Mass.) (617) 481-3901
P. O. Box 27, Southboro, MA 01772

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

SERIES I SPECIAL

Control Data
64, 126, 240MB
Removable Drives
Printers & Displays

New or Used
Immediate Delivery

IBM
4955F, 3101,
4978, 4963-64MB,
4975, Features

ALL UPGRADES — Save Money On Your Present Equipment With Our Purchase/Leaseback Program

DISK 3340 3350 3370 3375 3380

TERMINALS 3277 3278 3287 5251 5256

PRINTERS IBM — All Models NEC — Letter Quality for 5/34, 5/38 DATAPRODUCTS — 340 CPS to 1500 LPM for all IBM Systems

TAPE 3411 3420

LEASING SHORT OR LONG TERM NEW OR USED

4300 New or Used

SYSTEM 38 New or Used

SERIES I DISK TAPE PRINTERS FEATURES New or Used IBM & CDC CPU's ALL MODELS

SYSTEM 34

IF IBM MAKES IT, WE CAN SAVE YOU MONEY— whether you buy, lease or rent from us. We also need to buy your owned or rental credit equipment. Call us for a quote.

BUY SELL LEASE
IBM Maintenance Guaranteed, Equipment Configured to Your Requirements.

Marshall Lewis & Assoc., Inc. MI &A
1921 E. Carnegie Ave., Bldg. H, Santa Ana, CA 92705
(714) 641-0366

CDLA

LPI
LEAS PAK INTERNATIONAL
MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

Short or long term leases

NEW IBM S/38 DISCOUNTED FULL IBM SUPPORT

IBM 34/38

WANT TO BUY ALL SYSTEMS & PERIPHERALS

WE PAY CASH!

CALL COLLECT! (817) 268-0023

S/38 S/34 Series 1 System 3-32

Buy... Sell... Lease...

- Immediate availability
- 5224 & 5291 • Upgrades
- Short term leases • Trade-ins
- Guaranteed IBM maintenance

CDLA

The Datacomp Leasing & Service Group, Inc.

1-800-323-3289

Chicago 312/448-4300 New Jersey 201/467-8686

DEC VAX

DATA STAR INC.

DEC SYSTEMS

SYSTEMS
11/750, 11/44, 11/34
PERSONAL COMPUTERS

DISCS
FUJITSU, KENNEDY
W/EMULEX, DILOG

TAPES
KENNEDY, CIPHER, STORAGE
TECHNOLOGY W/EMULEX, AVIV

OPTIONS
ABLE, MICOM, RACAL-VADIC

COMPLETE INSTALLATION + SOFTWARE SUPPORT

BUY—SELL—TRADE-IN—NEW—USED

714-859-7880

23461 RIDGE ROUTE SUITE #H, LAGUNA HILLS, CA 92653

NEW IBM CPU'S & PERIPHERALS

SAVE

System 38 . Series 1
CRT'S: 5291 . 5251
PRINTERS: 5224 . 5219

- Shipped Direct From IBM
- Full IBM Support
- Discounted Below IBM

CARLYN
COMPUTER SYSTEMS, INC.
(703) 642-1950

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal Number 836, due Tuesday, June 14, 1983, 3:30 P.M., for the purchase of a mini/microcomputer for the Dairy Science Department at Mississippi State University.

Request for Proposal Number 837, due Thursday, June 9, 1983, 3:30 P.M., for the purchase of DEC or DEC compatible memory, disk storage hardcopy terminals, CRT, word processing printers and terminals for a DEC PDP-11/44 running RSTS/E operating system.

Request for Proposal Number 838, due Thursday, June 9, 1983, 3:30 P.M., for the lease of a data base management system for use on an IBM 4341 running under VM/CMS at the University of Mississippi.

Request for Proposal Number 839, due Wednesday, June 8, 1983, 3:30 P.M., for the purchase of a disk upgrade and controller for a Data General CS50 Model C5 running ICOS operating system.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Becky Adams or Elaine Knauss,
State Central Data Processing Authority
601/359-1395

BURROUGHS 6810
BURROUGHS 2930
BURROUGHS 1955
BURROUGHS 4800

BSI
2480 W. Alameda Ave
Denver, Colorado 80223
(303) 922-8331
Telex: 910-931-0483

CDLA Member Computer Dealers & Leasers Association

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems and advertise in--

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, **Computerworld Classifieds** will help you get a lot of exposure and get things done faster.

The open line rate is $8.05 per line and there is a minimum size of 1 column by 2" at a cost of $225.40. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First-time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Road
Framingham, Mass. 01701

CW COMMUNICATIONS/INC.

DATA GENERAL
New & Used Equipment

BUY. SELL. TRADE.

McINTYRE'S

(313) 583-4100

TLX: 810-232-4866
Answer Back: MCDATAGEN MAHS

Mini-Computer Sales Group Inc.

32050 Edward Ave.
Madison Heights, MI
48071

IBM 5291
Display Stations
Long and Short Term Leases
Month to Month Rent
$95.00 Including Maint.
(612) 559-7171

Midland Financial
12800 Industrial Park Blvd.
Minneapolis, MN 55441

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

REGIONAL MARKETING OFFICES

Atlanta, GA (404) 256-7942
Boston, MA (617) 367-5755
California (408) 773-1614
(415) 956-3183 (714) 752-8443
Chicago (312) 693-2790
Dallas, TX (214) 385-0806
Houston, TX (713) 780-7459
New Jersey (609) 645-7282
New York City (212) 349-0718
Tennessee (615) 449-6633
Washington, D.C. (703) 442-4941
Geneva, Switzerland Telex: 289950 WTCG
Montreal, Quebec (514) 871-1121
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 673-3081
Windsor, Ontario (519) 258-8910

CMI FINANCIAL SERVICES, INC.
755 W. Big Beaver, Troy, Mich. 48084
(313) 362-1000

CMI CORPORATION Since 1969
755 W. Big Beaver, 19th Floor, Troy, Michigan, 48084
TWX/TELEX: 810 232-1667 CMI CORP TRMI

(313) 362-1000

A Torchmark Company — Member CDLA

3033-U16
Fully Featured
Available Now
Lease or Sale

USED 3081-D's or K's
For Sale or Lease

3270

3033-N8
Fully Featured
Available Now
Lease or Sale

3081/3083
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

SYSTEM 34
SYSTEM 3
Dennis Pennington

3033
S to N N to U
Upgrades

Wanted 4341-M2
Call Now

3350 3880 3830
3340 3370 3330
3375 3380
Buy/Sell/Lease
Pat Callahan
Tim Ryan

3042
Attached Processor
Available Now
Short Term Lease

Wanted 4341-L01
Call Now

2914
3203 3505/3525
3800 3211/3811
Mary Drangin
3803/3420
Immediate Delivery

AMDAHL
V8 and V611
Available for
Sale or Lease

SYSTEM 38
Convert your IBM S/38 Lease to a CMI Leaseback
12-34-36 Month Terms
New/Used CPU's Avail.
Kevin Schaefer

Communications
IBM 3705
IBM 3704
Kathleen Austin

BUY·SELL·LEASE·TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today!

SYSTEM 32's, 34's, 38's

4300's All Peripherals

303X's and Peripherals

360's, 370's All Peripherals and I/O

3270's CRTS, Printers & Controllers

MCC

(214) 258-0541
TWX 910-860-9285

METROPLEX COMPUTER COMPANY, INC.
320 Decker Dr., Suite 180
Irving, Texas 75062

Dedicated to Service With Integrity

HP

1000
SERIES E, F, M

3000
SERIES II, III, 30, 33

7920
50 MB DISK DRIVE
7970E
1600 BPI TAPE DRIVE
2631B
180 CPS PRINTER
2622A
TERMINAL
& MUCH MORE

encore
(213) 393-8268

BROOKVALE

RENT·SELL·UPGRADE·BUY

DEC

PDP 8, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/45, 11/60, 11/70, VAX/750, VAX/780

SYSTEMS·OPTIONS·SUPPLIES

11/70	512Kb MOS, LA36 (new)	$48,500
11/23-BE	11/23 Plus, 512Kb MOS (new)	$5,995
VAX 730	System with license (new)	$29,850

Customized Configurations-Call With Your Request.

In Stock		Specials		In Stock	
BA11-KE (new)	$2,495	MSV11-DD (new)	$ 295		
DD11-CK (new)	$ 375	RK05-FA (used)	$ 795		
DD11-DK (new)	$ 575	RK07-PA (new)	$6,450		
DMF32-AA (new)	$3,495	RM02-AA (new)	$11,450		
DZ11-B (new)	$1,650	RM05-AA (new)	$24,850		
LA34-AA (new)	$ 975	VT100-AA (new)	$1,450		
MS750-CA (new)	$4,495	11/04-DC (new)	$2,850		

BROOKVALE ASSOCIATES
40 ORVILLE DRIVE • BOHEMIA, NEW YORK 11716

(800) 645-1167 • NEW YORK (516) 567-7777

Up to 50% Savings...

On Features/Installation/Discontinuance/Relocation

• IBM • STC • CONTROL DATA
• INTEL • MEMOREX • NSC

Guaranteed Maintenance Certification

• CABLES in Stock • Most Features In Stock
• Equipment Refurbishment

Special discounts available on 3031, 3032 and 3033 features and installations. This offer expires May 31, 1983. So call TODAY!

More than a financial alternative...
A better business decision
For more information call collect (312) 543-2667.

WORLD COMPUTER WORKS, INC.
502 Winthrop Addison, Il. 60101

We Buy & Sell

DEC

Systems
Components

Digital Computer Resale

call:713 445-0082
600 Kenrick Ste C22
Houston, Tx 77060

WANTED!

SYSTEM/32 **SYSTEM/34**

If you have a System/32 or System/34 to sell, we would like to buy it. We are dealing on behalf of already committed buyers and can afford to pay top dollar for your computer.

CONTACT
Mr. Walt Evans
Interstate Medical Billing
7578 Trade Street
San Diego, CA 92121

Call Toll-Free
800-582-6474

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

data3 computer corporation
IBM PROCESSORS/PERIPHERALS

GSD		DPD
S/34	• BUY • SELL • LEASE • SUB LEASE •	4331
S/38		4341
SERIES/1		TAPE
S/23		DISK
S/32		PRINTERS
S/3		TUBES

- All Peripherals
- Special Features
- Upgrades
- Flexible Leases
- On-time Delivery
- Purchase/Leaseback

11000 Prairie Lakes Dr., Suite 600, Eden Prairie, MN 55344
call toll free
1-800-328-7938
or (612) 941-9495 collect

CDLA Member Computer Dealers & Lessors Association
ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

DEC equipment
at the lowest prices
n-a-t-i-o-n-w-i-d-e!

Call toll free **800-328-7000**
In Minnesota (612) 894-4020 • Telex 291084

MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

Lambart

New DEC Stock Clearance

SV-BXWAB-CA (11/750)	$106,500
SM-WXLLA-CK (11/23)	$ 11,850
TWE16-EA	$ 16,000
TS11-BA	$ 10,600
MSV11-DD	$ 325
H960-DH	$ 4,100
861-D	$ 800
KEF11-AA	$ 180
RM03-AA	$ 10,000
RM05-AA	$ 23,500
M7258	$ 250
MK11-CE	$ 3,000
DZ11-E	$ 3,600

516-887-2500/1 TLX: 971963

IBM
BUY SELL OR LEASE
IBM CRTs, Printers, Controllers
IBM 3211/3811 Printer (Avail. Now)
IBM 4331 & 4341 Processors
IBM 3350, 3370, & 3375 Disks
IBM 3411/10 & 3420 Tape Drives
WANTED
3890-B4 & B5 Document Processor
3211/3811 Printer System
3203-5 Printers
Magnuson M80/32 Processor
REFURBED IBM MAINTENANCE
OCM, INC.
6604 W. 93rd St., Ste. A
Overland Park, KS 66212
(913) 381-2406

WANG SYSTEM 5 Model 3
$7500
Contact
D. Stewart
(617) 262-4354

DEC PDP 11/60 SPECIALS
128Kb
11/60-BA $5,400.
MS11-KE ..... $ 595.
FP11-EA..... $2,395.
BA11-PE ..... $1,395.
90 DAY WARRANTY CALL MARIE
NEWMAN COMPUTER EXCHANGE INC.
1250 N. Main P.O. Box 8610 Ann Arbor, MI 48107
(313) 994-3200 553JCW

FOR SALE
VAX 11/730
$35,000
Contact Ray Gillespie
(800) 354-9206
(In KY) (606) 278-0411

ALL IBM COMPUTERS ARE CREATED EQUAL
BUT, ALL IBM BROKERS ARE NOT!! CALL US

INTERSTATE COMPUTER EXCHANGE

EXPERTS IN
IBM
BUY • SELL • 72 HOUR UPGRADES

S/34
IMMEDIATE DELIVERY
ALL PERIPHERALS AND FEATURES
25% TO 35% OFF LIST

S/32 • S/38 • SERIES I • ALL IBM EQUIP.
NEW S/23 — LARGE DISCOUNT!!

GUARANTEED !!
IBM MAINTENANCE • DELIVERY DATES

WANTED: ALL DATAPOINT EQUIPMENT AND S/38's
WANTED —
- ALL S/34 CONFIGURATIONS
- ALL S/34 & S/38 PERIPHERALS
- ALL LEASED & OWNED MACHINES

BUYING OR SELLING EQUIPMENT
WE WILL LIST YOUR EQUIPMENT ON A COMPUTERIZED READOUT. IN MINUTES ALMOST EVERY BROKER AND DEALER IN THE COUNTRY WILL BE INFORMED OF YOUR PENDING SALE OR PURCHASE OF EQUIPMENT.

7578 TRADE STREET SAN DIEGO CA 92121 | CALL COLLECT | PAUL CAYTON (619) 578-5410

FOR SALE
Several
3101-12's
$685
Guaranteed / Refurbed
800-328-5718

NCR 8430
Processor +
(6) 6590 Disk Drives
Plus Disk Packs
For Immediate Sale
Call
212-255-5400, Ext. 263
For Further Details
Outside NY
1-800-833-8303, Ext. 263

TANDEM
Non-stop I
(2) CPU 480KB Each
(2) 45IPS 800/1600BPI Tape Drives
(2) 160MB Discs
(1) 240MB Disc
(2) Digital Associates 600LPM U/LC Printers.
Call for details -
Mr. Faulkner (312) 263-4222

BUY SELL LEASE
NEW IBM
CPU's & PERIPHERALS
AT DISCOUNTED PRICES
FULL IBM WARRANTY
34's, 38's, 5251, 5291, 5224, 5225, 5226, 3262

DATAMAN
3520 Overlook Circle, Knoxville, TN 37919
615-588-1863

We Lease IBM Equipment
(612) 559-7171
Midland Financial
12800 Industrial Park Blvd. Minneapolis, MN 55441

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $112.70 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $225.40 per insertion. Extra space is available in half-inch increments and costs $56.35. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:

_____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Box 880, Framingham, MA 01701

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

*** * * * DEC * * * ***

BUY—SELL—LEASE—TRADE—CONSIGN

— SYSTEMS —

11/44, Dual RM02, TS11, DZ11E
11/34A, Dual RL01, LA36, RSX11M
11/70, Dual RP06, TWE16, FP11C, RSTS
11/23, Dual RL01, RX02, DLV11J
11,780, RM05, RP07, TEU77, VMS
11/34A, Dual RK06, TJU16, RSX11M
11/70, Dual RM03, TWE16, LA120 50 HZ

— CPU'S — DISK-TAPE-MEMORY —

Call for Quotation

— OPTIONS —

FP11 (All Types), FP750, FP780
DMC (All Types), DMR11-AC, KMC11B
DT03, PCL11-A, DH11, DZ11
PC11, DJ11, DQ11, DV11, DU11
DUP11, DR11, KK11, RH11, LP11
TM03, KW11P, KW11W, KG11
RH780, MM11YP
MK11 Chassis, w/BBU

SPARE FOR ANY DEC UNIT
CALL FOR QUOTE

NATIONAL COMPUTER EXCHANGE

800-854-7224

6980 Aragon Circle, Suite 5 • Buena Park, CA 90620

(In Calif.)714-522-1870 TWX:910-596-1499

Depot **Memory Repairs** **$145**

- Most Manufacturers at this Price
- 5 - 10 Day Turnaround
- 90 Day Warranty
- Core Repairs Included
- Even Lower Flat Fees Available for OEM's, Repair Labs and Manufacturers
- Hundreds of Satisfied Customers Worldwide • 9 Years of Service

ALSO
• POWER SUPPLY REPAIRS
• DEC • DG BOARD REPAIR

ANY MANUFACTURER ALL MODELS

TOLL FREE **1-800-327-8662**

DIGITAL DATA SYSTEMS, INC
1551 N.W. 65th Avenue, Plantation, FL 33313
305-792-3290 Telex 232-005 Attn: DIGITAL

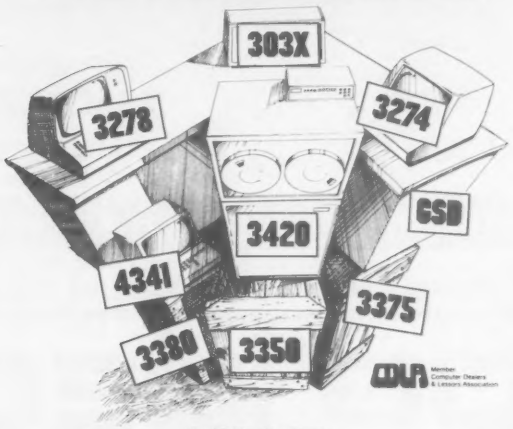
BUY-SELL-LEASE IBM SYS/34

- IMMEDIATE DELIVERY
- GUARANTEED M/A
- SHORT TERM RENTALS
- PERIPHERALS
- FEATURES-UPGRADES

MARION
84 KENNEDY STREET
HACKENSACK, N. J. 07602

(1-800) 631-1914
(201) 343-4554
(203) 758-2409

THE HARDWAREHOUSE IS HARD TO BEAT FOR PRICE AND AVAILABILITY.



Call Us Collect

UNITED STATES	
Boston: Eastern Regional Headquarters	**(617) 272-8110**
Washington, D.C.	(703) 525-5233
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Austin: Southern Regional Headquarters	**(512) 451-0121**
Atlanta	(404) 768-6535
Dallas	(214) 233-1818
Houston	(713) 629-4440
Chicago: Central Regional Headquarters	**(312) 789-9100**
Pittsburgh	(412) 922-8920
Detroit	(313) 995-8717
San Francisco: Western Regional Headquarters	**(415) 283-8980**
Los Angeles	(213) 670-7994
Denver	(303) 534-7436
San Diego	(714) 231-2361
Seattle	(206) 447-1682
Phoenix	(602) 248-5978
Portland	(503) 228-7033
Salt Lake City	(801) 298-4281
CANADA: Toronto	**(416) 366-1513**
Montreal	(514) 281-1925

BROKER/DEALER SALES AND LEASING
Phoenix: (602) 248-6848

CPU's, Memory	**Dave Keane**
Peripherals	**Sandy Mitchell**
Communications & Terminals	**Tim Stone**
GSD	**George Beck**
Leveraged Leasing	**Phil Iversen or Wayne U. Smith**
Broker/Dealer	**Dave Revere**

GREYHOUND COMPUTER CORPORATION
Greyhound Tower Phoenix, Arizona 85077, 800-528-6113

PRIME COMPUTER USERS

New 80 and 300 megabyte drives Available for immediate delivery. 300/1440 LPM Printers also available. Nationwide CDC maintenance and financing.

Call Barry Dacks
Timesharing Services Inc.
(904)396-7068

ALL 370 & 43XX SYSTEMS
CPU's & Peripherals Purchased, Sold & Leased

CORPORATE COMPUTERS, INC.

Contact: Norm Burger

(203) 661-1500
115 Mason St., Greenwich, Conn. 06830
Member Computer Dealers & Lessors Association

IBM
3270
PRINTERS, TERMINALS & CONTROLLERS
Please Call: (312) 943-3770
Forsythe/McArthur Associates Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

SALE **PURCHASE**

DATA GENERAL

6234 50MB Disk System
S/120 512KB
C/330
CS/30, CS/40, CS/50
MP100, MP200, 4207, 4221, 4225/27
D100, D200, D400, 5053 CRTs
8716 1MB C/150 Memory
8686 128KB S/140 Memory
Nova 4/C, 4/S, 4/X
4251 Comm. Chassis
ALM-16, ULM-5, SLM-2, DCU 200
AMI-8, ATI-16, 4062, DCU-50
6180 73MB Disk System
6181 147MB Disk System
6070 20MB Disk System
6045 10MB Disk System
6100/03 25MB Disk Systems
6098/99 12.5MB Disk Systems
6021 Mag Tape System
4327 300 LPM Printer
6125 Tape System
6101 Micro 12.5MB Disk System
6095 Micro 10MB Disk System
1144-B 2-Bay Cabinet

AMES SCIENCES, INC.
301/228-8100

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CALL **SCHERERS** FIRST

YOUR CENTER FOR

DEC ACCESSORIES & SUPPLIES

(614) 889-0810

SCHERERS

6145 SCHERERS PL.
DUBLIN, OH 43017

SCHERERS • SCHERERS • SCHERERS • SCHERERS • SCHERERS • SCHERERS

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

Buy Sell Lease Trade

Data General
Digital Equipment
Hewlett Packard

INTERNATIONAL COMPUTER REMARKETING
A Division of Parsons & Associates, Inc.

Texas • 214-785-1890
TELEX 730121 Plnsse DCVL
Illinois • 217-351-7932
California • 408-554-8717

3705

Buy, Sell, Lease

Call Bob Irish

(612) 884-3366

Centron-DPL Company

CDLR

The Minuteman Regional Vocational Technical School District offers for sale the following equipment:

(3) Digital PDP 11/24 Systems with RL02 Drives and 1/2 MB Memory each.

Specifications are available by contacting Donald Essman, Minuteman Tech, 758 Marrett Rd., Lexington, Ma 02173, (617) 861-6500 x215. All offers must be received by 2:00 p.m. on June 14, 1983 at the Office of the Business Manager, at which time they shall be publicly opened and read aloud. The School Committee of the Minuteman District reserves the right to reject any and all offers if it be in the public interest to do so.

For the School Committee
Donald Essman, Business Manager

SYSTEMS • PERIPHERALS • PARTS

DG | DEC

Phil Thomas
305-392-2006

Bryan Eustace
305-392-2005

Jennifer Eustace
305-392-2007

TELEX 568-670

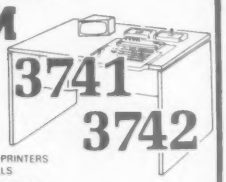
BUY - SELL - TRADE - LEASE

THOMAS BUSINESS SYSTEMS, INC.

Buy - Sell - Lease

S/32
S/34
S/38

IBM



3741
3742

CPU's CRT's PRINTERS
ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 90907
422 Acklen Park Drive
Nashville, Tennessee 37209

asc d MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

Call: Dick Geyer

1-800-251-2670

In Tennessee: 615-297-7516

BUY - LEASE

DEC AND DEC COMPATIBLE SYSTEMS

DEC-PLESSEY-EMULEX

- Systems and Subsystems
- Controllers
- Communications
- Memory
- Peripherals
- CDC Media

DEPOT REPAIR

DEC CPU's

PLESSEY CPU's

- All Plessey Controllers
- All DEC CPU Boards and Controllers
- All DEC Terminals
- Western Peripherial Tape Controllers
- Caelus Disk Drive
- Wangco Disk Drive
- Field Service Available Contracts/TM

Please call us for your quotes on your system needs and ask us for our depot repair price list.

Eastern Digital
1422 East Wilshire
Santa Ana, CA 92705
(714) 667-0504

DEC AND COMPATIBLES

(714) 859-5190

MICROLAW 23615 X El Toro Road #368
El Toro, CA 92630

B867 FOR SALE

96K	MEMORY
1MB.	MINI DISK
18.8MB	FIXED DISK
1	DATA COMM PROC.
6	LINE ADAPTERS
350	LPM BAND PRINTER
1	TD CRT CONSOLE

* * * * * * *

Burroughs Maintained In use at Hartford, CT. until July 1, 1983

* * * * * * *

Call (212)-333-4487
George Rey

• BUY
• SELL
• SWAP

Well-Equipped To Serve You In Buying Or Selling

• HARDWARE
• SOFTWARE
• COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week.

So placing an advertisement with us is going to help you take care of your computer-related business.... very quickly.

Call 1-800-343-6474
or send materials to:
COMPUTERWORLD Classifieds
375 Cochituate Rd.
Box 880
Framingham, MA 01701

buy sell swap | buy sell swap | buy sell swap

DEC DEC

DATA STAR INC

INVENTORY CLEARANCE

★★★★★★★★★★★★★★★★★★★★

THIS WEEKS SPECIAL

VAX 11/780, 1MB, H9602,
DZ11 A, LA 120,
414MB Disk, 125 IPS Tape

$189,000

★★★★★★★★★★★★★★★★★★★★

(8) DZ11-A	$2150	PDP11 45 IPS	$6495
DZ11-B	$1495	PDP11 75 IPS	$7595
DZ11-C	$2150	PDP11 125 IPS	$8495
DZ11-D	$1495	PDP11 300 MB	$13,995
TWE16	$9995	PDP11 160MB	$7495
PRO 350, 5MB	$7995	PDP11 414MB	$15,745

23461 RIDGE ROUTE SUITE #H, LAGUNA HILLS, CA 92653

714-859-7880

ABOVE EQUIPMENT CASH WITH ORDER

→NCR USERS

Are You Thinking of Trading Up ↑ ? or Down ↓ ?

Call Us for a Quote

SMITH ANDERSON CORP.
619-340-6680

Authorized NCR Systems Distributor - Nationwide
(New or Used Systems)

71-866 Highway 111
Rancho Mirage, Calif. 92270

FOR SALE
PERKIN ELMER
3230

2M ram - 600M disk
300 and 600 lpm printers
Two-9 track drives
Plotters, terminals
and more.
call (305) 285-1871

3350 A2-B2
Want to Purchase
Please Call Carol:
CSU INDUSTRIES, Inc.
516-239-4310

We're Buyers of
S/34, S/38, 4300
and Peripherals
Call us for the best offer
(612) 559-7171

Midland Financial
12800 Industrial Park Blvd.
Minneapolis, MN 55441

BIDS & PROPOSALS

SEALED BID NOTICE - INQUIRY #61383

Official sealed bids will be received by the State of Wisconsin, Dept. of Health and Social Services, Office of Information Systems, 1 West Wilson Street, Room B140, P.O. Box 7850, Madison, WI 53707 until 2 p.m. CDT, June 13, 1983 for the following Nixdorf Key Disk equipment.

(1) Entrex 480 (Model 3011) Control Group and 2.4 MB Disk
(1) Disk Module (Model 211) with 2.4 MB Disk
(1) 9/1600 Tape Unit (Model 321)
(21) Data/Scope Key Disk Terminal (Model 121)

A cashiers or certified check in the amount of $500 made payable to the Dept. of Health and Social Services must accompany each bid. For a copy of the bid and additional information call: Ed Schneider, (608) 266-6949.

REQUEST FOR INFORMATION

American Management Systems (AMS) is soliciting product information on behalf of a major Federal Government client. The product required must be a proven device (and software if required) to provide an interface between Burroughs mainframe I/O channels and open reel to reel magnetic tape equipment and magnetic disk storage equipment employing drives with a capacity greater than seven megabytes. The purpose of this device(s) is to bring the Burroughs I/O channels into FIPS PUB 60 and 61 compliance and thus allow for use of storage equipment which meets FIPS PUBS 62 and 63 requirements.

The CPU models for the Burroughs are B3500, B3700, B4700 and B4800. This synopsis is for planning and information purposes only and does not constitute a solicitation for bids or proposals and is not to be construed as committment by the government. Interested vendors are requested to submit a letter of interest in receiving a subsequent questionnaire. Literature on available products is also requested but is not a requirement for future consideration.

Responses should be sent no later than two weeks from the date of this advertisement to:

AMS, 1777 North Kent Street, Arlington, VA 22209; Attention J. Sheaffer. Only written responses will be excepted.

REAL ESTATE

FOR RENT
Computer/Office Building

Miami, Coconut Grove area, 3 story with approximately 20,500 sq. ft., with 5000 sq. ft. computer area, with raised floor and halon system. Emergency back-up generators, special air conditioning system. 50 parking spaces.

Call Coconut Grove Bank
(305) 858-6666

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

BASIC FOUR

410B System
Consists of
1343 Central CAB
Assy. w/CPU
2410 Disk Drive, 42MB
6400 MAG Tape Drives, 9.2MB
6903 MAG Tape Cart
1308 Memory, 64KB
150LPM Printer
9154 Power Option
w/8 Way Controller
(3) 7250 VDT's
All Equipment
Under Sorbus Service
Call 312-998-1600
Mr. Eissman

/BUY/ /SELL/ /LEASE/ /TRADE/

BASIC FOUR

- Complete and/or partial Systems...
- Peripherals: B/4 and Non-B/4.....
- SPEED and interface Consulting....

Sorbus Service is Guaranteed

//UNPS/Second Source System//
(209)473-4156 (408)971-9118

BASIC 4

SYSTEMS: 810, 730, 710, 610, 510, 410, 310, 210
COMPONENTS: For all systems. Currently parting out systems 610, 730
Spencer Systems Assoc.
6303 Acuff, Shawnee, KS 66216
Telex: 437275 (913) 268-5244

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!!
Boudreau Computer Services Ltd.
100 Bearfoot Rd.
Northboro, MA 01532
(617)393-6839
TWX 710-347-7574

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1855 Sys • B1955 Sys
• B90s • B900s
(Configured To Your Specs.)
SPECIAL: B1955 MEMORY

- SRI Terminals
- TD830s, MT983s, MT985s
- 206 & 207 Style Disk Drives
- Various Tape Sub-systems
- Memory Upgrades
- Printers 9248 & 9249 Styles

Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 292-3774
(Member IBDA)

SPERRY UNIVAC

WE BUY AND SELL
UNIVAC COMPUTERS
90 SERIES
80 SERIES
BC 7 SYSTEMS
1900 CADE
1100 SERIES
ANRIX CORPORATION
(602)949-0105

COMPLETE 90/30 SYSTEM
(1) 512 KB CPU (3) 8418
(12) UTS 400 CRT (3) 9/1600 Tape
(8) 8430 Disk (1) 1400 LPM Printer
Plus many features and control devices, under Univac maintenance contract, available June 1983.
Review & Herald Publ. Assoc.
Call: Joe Sheffield or Russ Wetherell
(301) 791-7000

NEW UNIVAC 1100/61 C2
Available Immediately, ITC Available, Maintenance Guaranteed, Very Large Discount - **Configuration Includes** - 3 MB Processor, 2000 MB Disk (2 x 4), (3) 6250 Tape Drive (U-36), 1200 LPM Printer, 750 LPM Printer, GCS; 7 Ports and Modems.
Direct From Owner
(612) 451-4361 or (612) 451-5275

V-77 800 SYSTEM
(2) 256K CPU w/2 Pages WCS
(2) 8433/20 200 MB Disk Drives
(4) 10 MB Disk Drives
(2) 800 bpi Tape Drives
(2) 800/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
THE EXCHANGE (209)444-7000
Ask for TOM BASS

HEWLETT PACKARD

BUY & SELL
1000 & 3000
Systems • Components
WESTERN DATA SALES, INC.
(213)539-8917

AIRBORNE DATA SYSTEMS
WE BUY AND SELL
HEWLETT PACKARD
1000 • 2000 • 3000 • 9800 SERIES
Systems • Peripherals
PO Box 3784
Sonora, CA 95370
(209) 533-2400
FAX Available

HEWLETT PACKARD
1000 • 2000•3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(613)725-9485
Tlx: 053-3025

HEWLETT PACKARD

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

IN STOCK
HP 3000
Model 40
7976's, 7933's, 7925's, 2619's
Call Bruce or Jean For Details
PVF Inc.
(301) 948-2684

HEWLETT PACKARD SALE
Client Must Sell Immediately
HP 3000/44 System
HP 1000L/10 System
Many terminals, printers, plotters, disks, tapes, desk top computers, etc.
FIRST COME - FIRST SERVE
Computer Clearing House, Inc.
719-381-1252

HP 3000
BUY & SELL
Complete Systems, Memory, Terminals, Disk Drives, Tape Drives, Miscellaneous Parts.
Charles Finley
ConAm Corporation
(213)458-2643
(Formerly Finley & Associates)

HEWLETT PACKARD

FOR SALE
HP/3000
Model 40 (1 MB)
7970 Tape Drive & Controller (9TR/1600 BPI)
7920M/7920S Disk Drives
2608A (400 LPM) Printer
2621B Terminal
2622A Terminal
(2) 2624A Terminal
2628F Terminal/Printer
Latest HP GL/AP/AR Software & RPG II - New CPU
Call Jack Aizenman
(212) 689-4424

RBG COMPUTER CORPORATION
FOR SALE OR LEASE
HP
3000 Series
Systems & Peripherals
Also
Direct™ Terminals
RBG COMPUTER CORP.
1685 West Hamlin Rd.
Rochester, MI 48063
(313)852-5233

The Bulletin Board

IBM

For Sale
1419 MICR
Call Dick Boyce
(813) 722-4534

158-U36
ISC, Madrids
Avail. Immediately
GTEX (214) 783-1212

AVAILABLE
3033U8 PROCESSOR
Will configure to your specifications
Available until 5/1/83
Flexible Terms
LEASING DYNAMICS, INC.
1717 E. 9th St., Cleveland, OH 44114
Call Bob Kendall (216)687-0100

FOR SALE OR LEASE
3211/3811 Printer
IBM 3350-A2 & B2's
WANTED
3203-5 Printers
Magnuson M80/32 Processor
3890-B4 & B5 Document Processors
3276-2 & 3278-2 Display Stations
OCM, INC. (913) 381-2406

AVAILABLE
3505/3525
w/Opt.Read
3380-A4
Call Sharon Lee or Bill Jurick (201) 846-2200

FOR LEASE
IBM
370/168-U34
Available Immediately
HFC Leasing Inc.
(312) 564-6288

WANT TO BUY
3880-1
Call Bill Jurick or Steve Roma
1X3 3350 w/String Switch
Call Steve Roma,
Judy Port or Bill Jurick
(201) 846-2200

WANTED
4331
K2 or L2
Call Bill Hegan
Computer Merchants, Inc.
914-238-9631

4341-L1
Short term lease
GTEX
(214) 783-1212

BUY-SELL-LEASE
CRT's & Printers
5291's, 5224's, 5225's
Available immediately with complete IBM systems. Call regarding our flexible lease plans.
CERES CAPITAL CORP.
(212)279-4467
(713)627-7724

FOR SALE
DATAMASTER
15.4 MB Disk, 64K CPU, (1) Disk drive, Software: A/R, A/P, P/R, G/L
As Unit Or Separate
W.J. SOFTWARE
(216)477-3477

FOR SALE OR LEASE
IBM 3864-2 Modems
Bluebonnet Computer Company
(512) 476-9362

FOR LEASE
3310
A2 & B2
Flexible Terms
Call Bill Hegan
Computer Merchants, Inc.
914-238-9631

IBM

FOR SALE
5285
C05
w/1150, 2500, 3505, 3701, 4601, 5801
Call Ron Gibb
914-238-9631

S/38
For Sale or Lease
S/34 Avail.
w/Upgrades
Vargo Companies
313-254-2850

IBM SERIES/1
Payroll Package
- EDX Version 3.1
- Runs in 14K
- Source plus user's guide

$950
SYSTEMS & SOFTWARE
36348 Northmont
Farmington Hills, MI 48018
(313) 533-2290

System 38 Lease Only
Model 4812Mb
3370-A11 Disk
3411-2 Tape
5211-2 Printer
Available Now
Wayne Johnson
(800) 328-5718

IBM SYSTEM 3 MODEL 12
5412 CPU 32K
3741 DIRECT ATTACHED
1403 PRINTER (465 LPM)
3340 DISK (100MB)
(6) 3348 DATA MODULES
$7,250
INTEX PRODUCTS, INC.
1-800-845-1468

FOR SALE
DECISION DATA PRINTER
Marc Ashton
DATA 3 COMPUTER CORP.
(612)941-9495
(800)328-7938

IBM 5280
Up to 50% Off!
Selling Entire Hardware Inventory
Various Configurations
Call: Fred Tuomi
Johnstown American Systems, Inc.
404-256-5460

FOR SALE OR LEASE
3276-2
3287-2C
3330-11
3350
3410-2 w/7330
LaSalle Computer Corp.
(312) 332-3220

FOR SALE
SYSTEM 3 MODEL 15-D
Complete System with BSCA, 1403 Printer, 3340, etc.
End user ready to sell immediately at a great price.
Contact: Dale Martin
(214) 238-7111
(214) 234-2654 (Home)

SYSTEMS 34/38
Lease or Sale
WANT TO BUY S/34's
(FOR INVENTORY)
Models & Peripherals
WE PAY CASH
LEAS PAK INTERNATIONAL
Tel.(817)268-0023

IBM SYSTEM 34
BUY • SELL • LEASE
32/34/38/Peripherals
Model & Feature Upgrades
20 Years Experience
Call Phil
Online Technical Services
(713) 672-7274

FOR SALE
IBM SYSTEM/38
Model 7 / 3 MB Memory
1 or 2 3370 disk drives
CRT's/Printers/Modems Optional
Available June 1, 1983
Annray Computer Sys-P.O. Box 68
Hays, KS 67601 913-625-7078

FOR SALE
SYSTEM 38
CPU-1536K, 1.5 MB, Expandable
3370 Disk, 5251 CRT's (13)
Call: Ralph Vowlin
Himalo Corporation
(404) 992-3000
No Brokers, Please

IBM

FOR SALE
IBM SYSTEM 7
48K 5012 Multifunction Module
5022 Disk
Peripherals
Call: Doug Magill
(216) 248-3600

FOR SALE
IBM AUTOMATIC TAPE LIBRARIES AVAILABLE NOW
CALL: CHRIS ELDERS
FOR SPECS
(214) 620-8380

ISN'T IT TIME YOU CONVERTED TO THE WANG VS?
RPG-II, COBOL, OCL
TOTAL CONVERSION
NETRON INC.
99 St. Regis Crescent North
Downsview Toronto Canada M3J1Y9
(416)636-8333

SYSTEM 34
BUY SELL LEASE
Peripherals - Features
Disk & Memory Upgrades
Call Carolynn Koucky
American Computer Exchange
(216)247-2100

SYSTEM 3
SALE OR LEASE
15D26 512K, LDA30 ports, BSCC1, BSCA 3277 Console, (28) 3277 MOD2-4633 Kybds., 3340 A02 Disk, 3344 B02 Disk, 5421 MOD-1 Print cntrlr., 1403 N1 Ptr., 1100 LPM 3741 reader.
Principals Only
Call Dennis Braun (216)696-7272

CONTROL DATA

FOR SALE
CDC MOD. 17/18A SYSTEM
Includes: CPU, (8) 1782 storage mod, 1750 digital subsys, (2) 856 disk drives, (2) 616 tape drives, 1733 disk cntrlr, 1732 tape cntrlr, 1729 card reader, 713 CRT, (4) 846 disk packs. All manuals-Cables incl.
CALL 619-571-8768
P.O. Box 17792 S. Diego 92117

CDC DISK SPECIALS

9766 300MB New	$10,950
9766 300MB Demo	9,500
9775 675MB Fmd	15,900
9762 80MB Used	3,700
9762 50-60HZ Kits	295

All Models in Stock • Buy and Sell
All Warranteed • Subject to Prior Sale
SYNTEL CORP. (919) 781-3021

DATA GENERAL

DG 6026 S/S NEW	$11,499
1144-S NEW (2-Bay)	$1,199
DG 73MB S/S NEW	$13,000
DG MCA #4206 w/cable	$950
Nova 4C RTC 64KB	$1,500
6021 New	$5,500
LP2 printer 6087	$1,450
6070 S/S, A/O	From $3,500

CALL FOR UNLISTED EQUIPMENT
SYSGEN DATA Ltd. (516)496-7777

8678-R S/140 512K/FIS/BMC	$17,900
8611-KB S/130 Eclipse 128KB	$5400
8448 C/300 Eclipse 192KB	$3600
6061 192MB Disk Subsystem	$18,800
6060 96MB Disk Subsystem	$14,800
8393-K NOVA 4X 128KB	$4500
9208-M CS/40 Mod. 5	$5700
8703 512KB MV/8000 MOS	$3800
Emulog-200 CRT New	Disc. Price
6108 D200 CRT New	$1488
Data Investors	(201) 836-7501

WE SELL, BUY, TRADE
D.G. Computers
Call the office nearest you for free brochure or quote
International Computer Remarketing, Inc.
TEXAS (214)-780-1800
ILLINOIS (217)-351-7982
CALIFORNIA (408)-554-8717

BUY - SELL - TRADE
New and Used D.G.
CPU'S, PERIPHERALS, DISKS MEMORY
Datatrend Inc.
(617) 233-9318 (800) 343-3616

DATA GENERAL

M600 SYSTEM: Includes 1.5 MB, 3-bay cabinet, (3) 6060 96MB disks, 6026 tape drive, DCU200, comm. chassis, ALM-16, ALM-8.
MV/8000 SYSTEM: Incl. 2MB AMI-8, ATI-16, 6026 mag tape,& 6061.

MISCELLANEOUS EQUIPMENT

8703 512KB MV/8000 Memory	$3,600
8555 256KB Eclipse Memory	$3,650
8387 256KB Nova 4 Memory	$2,900
8687 256KB S140 Memory	$2,900
6027 9-Track Subsystem	$5,800
6040 Dasher TP1 Printer	$900
6089 LP2 Printer	$1,500
6053 D2 CRT	$1,300
6108 D200 CRT (New)	$1,400
6061 192MB Disk Subsystem	$17,500
6061A 192MB Disk Add-on	$15,000
6061H 192MB Disk s/s	$18,500
6060 96MB Disk Subsystem	$13,000
6060A 96MB Disk Add-On	$10,500
8642 Burst Mux	$1,700
4357 IAC 16 or 24 line	CALL
4251 Comm. Chassis	$900
4215 600 LPM Printer	$5,800
4218 300 LPM Printer	$4,800
6060/6061 Zebra Adaptor	$3,500
(15) 6061 Disk Packs	OFFER
(150) 1200 Ft. Mag Tapes	OFFER

We Buy/Sell All Makes Of Computers
Intl. Computing Systems
P.O. Box 343, Hopkins, MN 55343
(612)941-2941

MEMORY
For MV/8000
or MV/6000
(4) 8703 512Kb Boards
$2,500 per Bd
Contact: C. Brown
(617) 451-3480

NPA SYSTEMS INC.
BUY, SELL, LEASE
DG EQUIPMENT
$2 million of equipment in stock
Service available in New York
Call for Price Catalogue
(516) 467-2500

DATA GENERAL NOVA FOR SALE
9207 - CS/40, Mod C5
6050 - 10 MB Disc Drive
6021 - 800 BPI Tape Drive
(Four) 6053 - Terminals
9125 - 300 LPM Printer
Data General Maintained
Make Offer
Call: Ron Patrick
(214) 243-3421

NCR

SPREADSHEET SOFTWARE
IDPS/IMOS $395 IRX $495 VRX $1000
30 DAY TRIAL • $50
SOFTWARE PRODUCTS CO.
P.O. Box 18814
Wichita, KS 67218
(316) 682-1762

MISC.

BUY AND SELL
NEW • USED • SURPLUS

Data General	Digital
Printronix	CRT Terminals
Data Products	CDC Disk
TI Terminal	Hewlett Packard
Diablo	Wangco

STC Tri Density For DEC VAX
SYNTEL CORP (919) 781-3021

DATAPOINT
Buy* Sell*Trade
American Computer Exchange
(216)247-2100

FOR SALE: 288 - 2' x 2' computer flooring tiles and data vault, 71'' x 52'' x 36''. Call Nancy Hopp, Waubonsee Community College, Sugar Grove, IL, **(312) 466-4811.**

FOR SALE
RAMTEK
USED EQUIPMENT
Color Graphics Terminal-Model #6200A-Assy 50420 Keyboard-Model #RM6000-Assy 503061-02.
Contact: J. Persson
(312) 876-7000 ext. 607

DEC

DEC SPECIALS
- (1) 11/70 w/1/2MB MOS, Dual H960 Cab
- RK07 Unused, $4,500
- FP780-AA, Call
- TGU77-AB, Call
- DMR11-AD, Call
- BA11-KE New, Call

SEVCO INC. (617) 435-6938

FOR SALE

VAX 11/780	2 Mb memory
TU78	1600/6250 BPI Tape Drive
RMOS	256 Mb Disc
RP07	512 Mb Disc
LP-11-DA	6601 ipm printer; 132 columns
10 LA180	Printing Terminals

Available Software, License Only:
FMS, DBMS, DATATRIEVE, CDD, VAX-11, COBOL
Price-Negotiable-
Will take 11/750 as trade-in
Call (213) 340-4041 or in California (800) 942-8403

DEC "RAINBOW"
192K MEMORY EXTENSION
$599
Interchangable with DEC PC1XX-AB
1 year warranty; heat cycled
INTERMEDIA SYSTEMS
(408) 996-0900

Call For Your DEC Needs

861-D	$750	BA11-KE	$1,650
DD11-CF	$100	DL11-W	$425
DZ11-A	$2,195	H754	$295
RH780	$5,995	RKV11	$595
RPO6-BA	$16,500	TU45-KE	$3,995

Pacific Computer Sales, Inc.
(408) PDP-1170
Telex 172337

BUY • SELL • TRADE

1105-SC	$1795	LP11-VA	$2950
CR11	$1295	MS11-LB	$ 950
DL11-E	$ 295	PC11	$1295
DMC11-AL	$1195	RH11-AB	$2995
DMC11-MD	$1095	RK07K-DC	$ 195
FP11-C	$3995	RM80-C	$1495

NEW YORK COMPUTER EXCHANGE
(516)752-8686 (800)645-9109

FOR SALE: DISK PACKS BRAEGEN PERIPHERALS
- DSC302-6 (Century T-302RM) disk drive w/Emulex SC70/B2 cntrlr, (4) disk packs.
- (2) Disk packs for RPO6 disk drive.

Call Keith Carlson
816-361-4194

DEC SPECIAL
Available Immediately
Dual RMO2 Disk Drives
and RH11 Controller
Call: Alphabyte, Inc.
(714) 680-6511

DEC

DEC SYSTEMS
11/03 systems w/RL01 disk, LA180 printer., 84KB memory, RT-11 license $4,500
Complete packaged 11/23 systems with dual RL02 $12,500
LA180 ptrs. w/interface & cntrlr. $500
Other Configurations CALL
E.E.C. Systems Inc.
(617)443-5106

DEC 11/70 - VE
(2) RM03 TWE 16
H960 - DH, RSTS
$59,500
LAKEWOOD COMPUTER CORP.
3260-9 Keller St.
Santa Clara, CA 95050
(408)266-2545

DEC PDP 11/34A
256KB, RX01, FP11A, LA180, IB11, VT100AVO, 2-DZ11's.
CDC 9766 300MB Disk, Pertec 800/1600 BPI Tape, 3-Disk Packs, 10-2400' Tapes.
Certified for Maintenance $40,000
Call Roger L. Cordes, Jr. William G. Daniel & Assoc. (919) 467-9708

USED DICK PACKS
Guaranteed
RL02, RL01, RK06
ESS (701) 237-0689

DEC
SELL BUY
• Processors • Peripherals
Other Items Available
UNITED COMPUTER BROKERS
(213)344-0688

PROPERTY MANAGEMENT
On-site property management software for micro-computers. Must be able to communicate with VAX/VMS.
Data Processing Manager
16311 W. Ten Mile Rd.
Southfield, MI 48075
(313) 557-7700

VAX RESOURCE ACCOUNTING AND CHARGEBACK SYSTEM
Easy to use/Ext. help/Menu driven Mgmt reporting/Disk accounting Royalty accounting (3rd party) Project Acontng/Multiple discounting Variable sales/Prime/Non-Prime time
$1200.00 U.S.
Virtual Computing, or (100,525-11 Ave.SW. Calgary,Alta.,Canada T2R0C9,(403)288-7440

LARGE MULTI-BILLION DOLLAR FINANCIAL SERVICES CO.
Requires An
INTEGRATED ACCTNG. SYSTEM
(G/L, A/P, A/R & Fixed Assets)
Must be a proven system running on a DEC-VAX/780
Write w/full details to: **J. Lindquist**
P. O. Box 2470, Oakland, CA 94614
Or Phone: 800-445-9082 (CA) 800-445-9020 (National)

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. **Computerworld** comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $115.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 **800-343-6474**

The Bulletin Board

PERKIN ELMER

FOR SALE
PE 3210
Super 32 bit minicomputer
34% DISCOUNT
2 Meg Memory
96 MB Disk Drive
Available Now
Tel. (816) 561-1800

DISK DRIVES AND PACKS

CDC DISK
9775 675 MB
9766 300 MB
9762 80 MB
9730 80/160 MB
PHOENIX All Sizes
Nationwide Installation
Maintenance/Full Warranty
Choice of 50 or 60 Hertz
All models available
$AVE • $AVE • $AVE
Call 214-262-8201
DIMENSION SYSTEMS

DISK DRIVES AND PACKS

CDC DISK
ALL MODELS
IN
STOCK SALE
Nationwide Installation
Maintenance/Full Warranty
Choice of 50 or 60 Hertz
$AVE • $AVE • $AVE
Call 214-262-8201
DIMENSION SYSTEMS

DEC/WANG/PRIME

Fijitsu 169MB (New)	$5500
9766 300MB Like, Rackmount	$9000
CDC 9762 80MB (New)	In Stock
CDC 9448 96MB (New)	In Stock
CDC 9715 160MB (New)	In Stock
CDC 9766 300MB (New)	In Stock
CDC 9775 675MB (New)	In Stock

Installation & Maintenance
System Technology Assoc.
Deborah Doneghue 612-647-0802

FIJITSU EAGLES
474 MB $10,500
160 MB 6,900
Also Full Line of
SI Controllers;
STC TRI Density For DEC VAX
SYNTEL CORP (919) 781-3021

PRINTERS

$2,950
NEW/SURPLUS
DATAPRODUCTS PRINTERS
300 Line/Minute
Immediate Delivery
SAGA ENGINEERING CORP.
20935 Nordhoff St.
Chatsworth, CA 91311
(213) 998-6066

MISC. SYSTEMS

FOUR PHASE
(1) IV/90-S SYSTEM (384K)
(3) 7167-8 Remote Display Processors
New/Fully Optioned/Available
TVM, INC.
900 Long Blvd., #209
Lansing, MI 48910
Contact: R. A. Haight
517-694-4328

VICTOR 9000's
$2,850 Plus Shipping
Our Loss Your Gain
Bought 20 Victors
for project that didn't fly
New, still in boxes ready to ship
Call Jim (714) 891-8636

QANTEL

FOR SALE
Qantel 960,
64K, Disk Drive,
CRT Controller
Qantel 1400 Processor,
128K
1-800-528-4404

WANG

Psssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
I.C.A.
(404) 953-6286

FOR SALE
(1) Wang 90 Meg
"Phoenix" Disk Drive
Call: Lionel or Hilda
(216) 539-5433

WANG

WANG 2200 MVP SYSTEM
WANG 2200MVP System, including 2200MVP-16 CPU (64K user memory), 2236MXD 4 Port Terminal Multiplexer, 2280-1 Disk Drive (26.8 MB) and Interface, 2221W Printer, 22002 Printer Controller, 2227B Buffered Asynch TC Controller, two 2236DE Terminals.
Contact G. E. Lyons, The Cheviot Corporation, 55 Fourth Avenue, Needham Heights, MA 02194. (617) 449-1100.

WANTED
Used, Excess
WANG Parts, Equip't.
OIS - VS - WP - 2200

FOR SALE

2256-C Brand New!!	$4,200
2280/6580 Equiv "Phnx"	$7,800
2265V-1 Equiv (Pre-owned)	$4,800
2265V-2 Equiv (Brand New)	$12,900

(617) 372-8536
CFR Associates, Inc.
18 Granite Street
Haverhill, MA 01830

WANG

SYSTEMS BUY/SELL PERIPHERALS
DATA & WORD PROCESSING
CPU's, CRT's, Disk & Tape Drives, Printers, Memory Upgrades, Disk packs
(212)431-1100
ERST INTERNATIONAL

For Sale
WANG WPS-30
Refurbished
Word Processing System
Incl: CPU, 10 Meg Disk, Wkr. Sta. & Daisy Ptr.
$8,900
617-372-8536
Mr. Dwight Krantz

ISN'T IT TIME
YOU MANUFACTURED
YOUR SOFTWARE?
VS COBOL
COMPUTER AIDED
PROGRAMMING
CAP *Speeds Development*
CAP *Improves Control*
CAP *Reduces Maintenance*
CAP *Enforces Standards*
NETRON INC.
99 St. Regis Crescent North
Downsview Toronto, Canada M3J1Y9
(416)636-8333

SOFTWARE FOR SALE

HP3000
BUSINESS MANAGEMENT SYSTEMS

- CJ/PAYROLL
- CJ/PERSONNEL
- CJ/ADVANCED GENERAL LEDGER
- CJ/ACCOUNTS PAYABLE
- CJ/ACCOUNTS RECEIVABLE

Written in COBOL II and utilizing V/3000. May be used as stand-alone modules or an integrated system complete with on-going:

SUPPORT-MAINTENANCE-ENHANCEMENT

COLLIER JACKSON, Inc.

Call us today, or write our Corporate offices at 5406 Hoover Blvd., Tampa, Florida 33614 (813) 885-6621

Changing Computers?
Retain your SOFTWARE INVESTMENT

Dataware's conversion approach provides the solution to management's conversion problems and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- AUTOCODER/SPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Faced with Conversion? Call or write today

The Conversion Software People
Dataware, Inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8722
TELEX: 91519

HDS • HDS • HDS • HDS • HDS

HARRIS USERS . . .
STILL OUR BEST SALESMEN!!
Quality Software PRODUCTS FOR THE
IBM SYSTEM/34 and 38

". . . Our new Harris G/L System reduced period close processing for our 40 company environment from 22 to 2 hours! Staff resources are now free to accomplish other tasks . . ."
Lyall Electric

". . . Harris Data Service definitely offers **complete** support along with the packages themselves . . . your staff has given us both in-person and telephone support whenever necessary - and promptly!"
Coca Cola Bottling Company - Chicago

". . . I must say that our requests for your installation/usage help have hopefully been minimal because of your excellent user documentation — It's simply simple!"
Beatrice Foods Co.

". . . One of the most impressive software support firms we've worked with — thank you, Harris Data Service . . ."
American Can Co.

People Are Talking!!
HARRIS DATA SERVICE
11629 W. Dearbourn Ave.
Milwaukee, WI 53226
(414) 475-1760
Offices and Distributors Nationally

Elegant Software for IBM S/34 & S/38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	**All Systems are:**
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J. D. Edwards & Company

4949 S. Syracuse Street/Suite 5500
Denver, CO 80237
303/ 773 3732

Dallas — 214/ 458 0636
Northern California — 415/ 697 7754
Southern California — 714/ 751 5302

TOM SOFTWARE

For WANG Computers
Licensed Consultants Worldwide

TOM (THE OFFICE MANAGER), INC.
Box 66596, Seattle, WA 98166
Tel (206) 246-7022
Telex 32-0011 (TOM SEA)

PROVEN DATAPOINT SOFTWARE

- General Ledger
- Accounts Receivable
- Accounts Payable
- Computer Aided Programming
- Software 'Print Key'
- RMS/DOS Consulting

THE INNOVATORS™
3407 West Wendover Avenue
Greensboro, NC 27407
(919)854-2540
1-800-334-0547

DIAL-A-DEMO
SEE OUR WIDELY USED DBMS
KEY/ 500
AND RELATED ACCOUNTING PACKAGES

Order Processing	
Accounts Receivable	For DEC
Inventory Accounting	RSTS/E
Accounts Payable	And The IBM
General Ledger	CS9000
Payroll	

SAUER computer systems
314-962-0382 • 800-325-9494
SOLID SAUER SOFTWARE
STEADILY UPGRADED SINCE 1974

software for sale	software for sale	software for sale	software for sale	software for sale

PDP-11 & VAX USERS

Make your mini perform like a mainframe

High performance. You need it when you go on-line. And you get it with CYX. You don't need a mainframe to build high performance on-line application systems vital to your day-to-day operations. Not even when you have a large number of concurrent users or a huge data base. With CYX, your mini will deliver the kinds of throughput rates and response times you once could only get with a mainframe.

The CYX Transaction Processing System gives you high performance and reliability because it:

- Manages block mode communications using 3270 (or compatible) terminals and fully buffered DV11 (or compatible) multiplexors.
- Keeps frequently accessed records in a dynamically controlled record cache.
- Synchronizes concurrent accesses at the record level.
- Optimizes disk throughput by distributing files across multiple drives.
- Reorganizes the data base dynamically.
- Allows spawning of frequently used processes.
- Provides transaction rollback, duplicate data recording, data journaling, and automatic restart/recovery for high reliability and system integrity.

Find out how to get top on-line performance with CYX and your PDP-11 or VAX by talking to Cytrol today.

"High performance software for vital business needs"

cytrol

4570 West 77th St., Edina, MN 55435 Phone 612/835-4884
In the Northeast, contact: Russell Gloor 914/782-7822

Specializing in IBM System/38

FRIEDMAN & ASSOCIATES, INC.

710 Wemel Road
Deerfield, Illinois 60015
(312) 945-7160

Totally on-line order entry, complete manufacturing systems, MRP with on-line net change

- Fixed price software including customizing
- Management consulting
- Ten years experience

We make it work!

IBM SYSTEM/34 RPG II

DATA STRUCTURE GENERATOR AND PROGRAM MAINTENANCE SYSTEM

This system will increase your workstation program productivity **BECAUSE** of these automatic features:

- Create an MRT data structure
- Recreate an MRT data structure
- Recalculates all data structures
- Strip zeros from SDA's skeleton program

WHICH MEANS to you...

- Less keying
- Less calculating
- Less program maintenance

And the real **BENEFIT** to you is...

- Faster program development
- Easier to read programs
- Less risk in program development

$95

Please send my diskette to:

_____

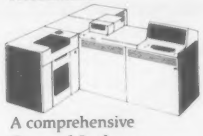
_____

_____

☐ Check encl. ☐ Bill me
NYS residents please add 7% sales tax

INTERSTATE INFORMATION SYSTEMS
2 INTERSTATE AVE
ALBANY, NEW YORK 12201

Designed specifically for the
IBM System/38
and the Management Accountant



A comprehensive
General Ledger, Financial Reporting and Budgeting System

DHDial Company
Financial Accounting and Reporting Systems

Murray Financial Center
5550 LBJ Freeway, LB-1
Dallas, Texas 75240
(214) 458-0987

Financial Planning, General Ledger Reporting System
for
IBM SYSTEM/38
call:
Interactive Program Products Inc
800 Second Avenue
New York, NY 10017
(212) 752-5252
In Chicago (312) 693-6300
In Houston (713) 960-1315

Insight

UAP-LINK
File Transfer Software!
Mix and Match -

Micros:
IBM PC, DEC, OSBORNE 1

Minis:
RSX-11M, TSX-PLUS, RT-11

Maxis:
DEC VAX/VMS, RSTS

- Error-free Binary and Text
- Use Standard Serial Ports
- Compressed Transmissions
- Smart Terminal Mode
- Demos Available

Unique Automation Products
15401 Redhill Ave., Suite G
Tustin, CA 92680
(714) 730-1012

DEC 10/20 Languages

- ACCENT R
- Maxbasic
- Pascal-Plus
- RPG-II

NIS NATIONAL INFORMATION SYSTEMS
20370 TOWN CENTER LANE
CUPERTINO, CA 95014
(408) 257-7700

Accounting Software For Vax

Long time a supplier to DEC RSTS users, PLYCOM now has software for VAX. Easy to learn. Simple to use. Complete support and training. Excellent documentation. In Basic for VAX and VMS. Applications now available include:

- General Ledger
- Financial Reporting
- Accounts Payable
- Fixed Assets Reporting

Plycom services, inc.
P.O. Box 380465
San Antonio, TX 78280
(512) 734-4366

Analyze system and program performance on your
IBM SERIES/1

The Performance Analyzer for EDX systems measures and reports on resource utilization for single programs or complete systems.

H & A Computer Systems
30 Hotaling Place #204
San Francisco, CA 94111
(415)434-3517

SERIES/1 SPECIALISTS

SCOUT™
an affordable software directory

524 PACKAGES LISTED | 1,674 HARDWARE TYPES | 607 VENDORS
S/38 S/34 S/23

$50 PER YEAR FOR EACH HARDWARE TYPE INCLUDING TWO UPDATES

Rates per hardware type: USA $50 (CA add 6%) Canada and Mexico $55. All other countries $70 (U.S.)

For subscription information write:

Software Press, Department C
1523A N. La Brea Ave., Suite 179
L.A., CA 90028 / (213) 785-3585

Announcing the best System/34 documentation money can buy. For $600.

And wait til you see Rel 3

REMDOC Rel 2—$600 — Automatic multi-library system documentation including flowcharts

Compile/PLUS—$150 — Screen & printer layouts plus indicator summary with each compile.

LMU—$250 — Full screen, multi-member library maintenance utility.

Rem Associates
P.O. Box 527
New York, NY 10014
212-243-2416

Rel 2 clearance sale
FREE 30-day trial
FREE upgrade to Rel 3 in September

APPLICATION SOFTWARE CUSTOM WRITTEN AT PACKAGE PRICES

FOR DEC10 AND DEC20 USING COBOL AND 1022

ALSO
DEC10 TO DEC20 CONVERSIONS
VAX & PDP11 IN COBOL AND BASIC

SOFTWARE ENHANCEMENTS
(603) 889-5755
400 AMHERST STREET
NASHUA, NH 03063
TELEX 953027

IBM SYSTEM/38 BUILDING BLOCK SOFTWARE SYSTEM

RMS/38 offers full range of integrated applications for distribution, manufacturing and financial users. On-line systems using data base management. Menu driven. User friendly. RPG III code. Documentation and support. Ready to go. Ready to grow.

Call: (312) 932-2200

pcr professional computer resources

2021 Midwest Road, Oak Brook, IL 60521

Ask About Our
FREE SOFTWARE OFFER
+
FREE ANTI-GLARE FILTER
for
WANG-VS
Minicomputers

- EXECUTIVE SECRETARY II Automated Meeting Scheduler, Calendar & Messaging
- INTERACTIVE FINANCIAL PACKAGES
- WP/DP INTEGRATION-LIST PROCESSING
- PROG. & DOCUMENTATION AIDS
- CUSTOM APPLICATION DEVELOPMENT

Call or write for product brochure and price list.

Minicomputer Interactive Systems
9550 Firestone Blvd.
Downey, CA 90241
(213) 862-1605 24 Hrs.

"...the Innovators in Information Technology"

MESSAGE-SWITCHING

Cut costs and improve intra-office communication with **TELEMESSAGE** software.

- utilizes existing IBM DOS/OS network
- eliminates teletype costs within the network
- provides instant action/response
- is easy to install and use.

by **COMPUTER CONCEPTS, INC.**
928 Broadway, N.Y., N.Y. 10010
(212) 777-5200

SOFTWARE WANTED

SOFTWARE PRODUCTS FOR YOUR
TANDEM COMPUTER

CONTROL™ Source Management
COMPARE™ File Utility
MTE™ Multi-Tasking Exec
STOCKAID™ Securities Database

CONTRACT AND CUSTOM SOFTWARE ALSO AVAILABLE

NETWORK CONCEPTS, INC.
TWO RIDGEDALE AVE., CEDAR KNOLLS, NJ 07927
(201) 285-0202

SOFTWARE MANAGEMENT SOLUTIONS

Take advantage of the consulting service that improves effectiveness.

Roger S. Gourd, Inc.
700 NW 74th Avenue
Plantation, FL 33317
(305) 583-0583

WANTED
STATE-OF-THE-ART SOFTWARE

Successful software company seeking additional products to market. Must run on IBM mainframe or PCM's. Prefer programmer/operations productivity aids. Send abstract of product to:

J. Martin
Triangle Software Co.
4340 Stevens Creek Blvd.
Suite 108
San Jose, CA 95129

LARGE MULTI-MILLION DOLLAR FINANCIAL SERVICES CO.

Requires An
INTEGRATED ACCTNG. SYSTEM
(G/L, A/P, A/R & Fixed Assets)
Must be a proven system running on a DEC-VAX/780

Write with full details to:
JERRY LINDQUIST
P. O. BOX 2470
Oakland, CA 94614
Or Phone: 800-445-9052 (CA)
800-445-9020 (National)

BUSINESS OPPORTUNITIES

TIME & SERVICES

AUSTRALIA

LIONEL SINGER, Australia's leading computer marketeer will be at the N.C.C. in Anaheim from May 15th through May 19th and can be contacted at the Anaheim Motor Lodge (714) 879 6440. Should you wish to discuss your product with him please call.

SOLE AND EXCLUSIVE USE OF AMDAHL V8

Configuration:
- .12MB with 12 Channels
- .24 Hour Staff Support
- .MVS, VM or Software of Your Choice
- .Network Access
- .30 Volumes of 3350 Disk
- .8 - 1600/6250 BPI Tapes

PRICE: $145,000 PER MONTH

Additional Volumes at $1,000/month
Additional Tapes at $750/month
Network Cost Approximately $15/hour
Additional I/O and network prices will be determined by configuration needed.

If seriously interested, please reply to:

CW-B4151
Computerworld
Box 880
Framingham, MA 01701

Computer & Memory Repairs

Any Manufacturer's Memories
CORE.....SEMI

DEC®—DATA GENERAL
Complete CPU'S and Memories

T D C
THREE DELTA CORP.
1038 Kiel Court, Sunnyvale, CA 94086
(408) 734-2680 TWX 910-339-9511

VAX/VMS TIMESHARE

5¢ PER CPU SECOND

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
LOS ANGELES & ORANGE COUNTY LOCAL DIAL-UP LINES
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH

MIDCOM CORPORATION
(714) 99VAX11
(213) 516-9590
(714) 998-8070

TIMESHARING VAX 11/780 VMS

Short or long term PRIME TIME	Interactive or batch SECONDARY TIME
$100.00/CPU hr. $2.50/hr. connect time	$60.00/CPU hr. $1.50/hr. connect time

***** Disk: $40.00/MB/MONTH *****

Per port rates and other charge bases available.
CALL US... WE ARE FLEXIBLE TO MEET YOUR NEEDS
Basic/Pascal/Datatrieve/FMS/EDT/WORD-11
WE PERFORM FULL DAILY TAPE BACKUP OF ALL DATA
Call or write:

Computing Services Department
ALDEN PRESS, INC.
2000 Arthur Avenue
Elk Grove Village, Ill. 60007
(312) 640-6000 ext. 542 or 543
TLX 468799

WE'VE GOT TIME FOR YOU

PRODUCTION/DEVELOPMENT TIME

- EXCELLENT ONSITE & REMOTE SERVICE
- PROD. BACKUP/DISASTER RECOVERY
- REMOTE HARDWARE AVAILABLE
- DEVELOPMENT AIDS, RELATIONAL DB, ETC.
- ANALYSIS, DESIGN & PROGRAMMING
- PRIME 550-II, 1mb, 800mb DISK, TAPE, PRT

FIRST 25 HOURS FREE!

(212) 466-6797
TSL
ONE WORLD TRADE CENTER
SUITE 7955, NEW YORK, NY 10048

WANTED

To Buy
COMPUTER SERVICE BUREAU
anywhere in the U.S.A.
Batch or On-line
Respond to:
K. Felbinger
Suite 3400
3 First Nat'l. Plaza
Chicago, IL 60602
(312) 977-4365

Computer Services

CURTIS WRIGHT

4341-2 370/158-3

VS1-CICS-ROSCOE-DOS

REMOTE JOB ENTRY
CICS DEVELOPMENT
CICS PRODUCTION
CUSTOMIZED SOFTWARE

CONTACT JOE BARRETT
(201) 777-3454

15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

TIMESHARING VAX 11/780-VMS

- FORTRAN
- BASIC
- COBOL
- DATATRIEVE
- Telenet Access
- Floating Point Accelerator (Interactive Batch)
- Direct Dial

Graphics
Author Programs
Custom Software
Hydrology Softw.
Petroleum Softw.
Low Rates
Detailed Resource Acctg.

Volume Discounts

7-Day, 24 Hour Service

Contact: Richard Santoro
In-Situ Inc.
209 Grand Ave.
Laramie, WY 82070
(307) 742-8213

FAST TURNAROUND ON REPAIR SERVICES

Computer Boards
Memories/Peripherals
Power Supplies

All Manufacturers

Real Cost Savings

Flat Rate Contracts Available

Emergency Repair
24 Hrs. 212/741-3800

NEW YORK REPAIR DEPOT inc
22 West 23d St., N.Y., N.Y. 10010

WANG VS - AUSTRALIA

I will be in the States for the last two weeks of MAY and am interested in negotiating for Australian software distribution rights. If you are interested please write to:

L.V. BUCHANAN,
Better Dynamic Computing Pty. Ltd.
c/o Tony BROMAGE
Wang Laboratories, Inc.
One Industrial Avenue
LOWELL, MASS 01851.

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 688-5760

FLEXIBILITY

That's what makes us special. Our clients don't adjust to our capabilities—we adapt to their needs.

We offer a multi-operating system that can fulfill any requirements and the finest "results-oriented team" around.

3031 4341 3350 3330-II
OS/VS1 VM/370/CMS/RSCS
RJE—IDMS—SAS
DOS/VS DOS/VSE
Brokers Welcomed

Call us at:
(201) 766-5454

ALLIED COMPUTER SERVICES, Inc.
170 MT. AIRY ROAD
BASKING RIDGE, NEW JERSEY 07920

Timesharing PRIME

- FORTRAN
- BASIC V (Virtual Basic)
- COBOL
- RPG II

BLOCK TIME ARRANGEMENTS AVAILABLE

CONTACT: Dolores Kwain
The Functionality Group Inc
180 North Michigan Avenue
Chicago, Illinois 60601
1-800-621-9155
312-372-6070 in Illinois

MFRS REP

Leading mfr of EMI/RFI shielding coatings is seeking several professional reps who are currently calling on electronic & computer companies. Background in this field plus experience calling on finishers and molders very helpful. Existing business will be turned over. Fantastic opportunity to get in on the hottest line in yrs. Send line card and complete to:

VP OF SALES
P.O. BOX 1404
New Haven, Conn.
06505

LOOKING FOR DEVELOPMENT TIME?

NO KILOCORE TICK CHARGES
NO CPU CHARGES

$7 PER HOUR CONNECT TIME

RSTS-E TIME

BASIC PLUS 2
COBOL
BASIC PLUS
PASCAL
'C'
} WITH CROSS COMPILER SUPPORT

WORD-II WORD PROCESSING
WAFE
TECO
EDT
} PROGRAM EDITING

BUDGET BYTES™
212-944-9230

by Omnicomputer™
1430 Broadway, New York, N.Y. 10018

COMPUTER TIME FOR SALE

I.B.M. 360-40

All Shifts, 128K, 4-2401
MOD-2, 9-2314, 1403-N1,
2540,

From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036
Contact
Al Palmo (212) 997-1411

DEPOT— COMPUTER REPAIRS

DEC-DG
ALL BOARDS
1-2 WEEK TURNAROUND

MEMORIES
POWER SUPPLIES
DISKS PACKS AND TERMINALS
ANY MANUFACTURER

DIGITAL DATA SYSTEMS, INC.
1551 N.W. 65 Ave., Plantation, FL 33313
305-792-3290
1-800-327-8662
TELEX-232005 ATT DIG

ADVERTISERS INDEX

Albert Frank-Guenther Law 95
Altos Computer ID/40
Aluminum Case Co. ID/37
AMDEK Corp. 75
American Bell 11
American Key Data ID/6
Anaconda-Ericsson 64
Apollo ID/18-ID/19
Apple Computer ID/4-ID/5
Applied Computer Research 32
A.S.T. Research ID/42-ID/43
American Tel & Tel 148-149
Auragen 72-73

BASF ID/26
BDS Computer Corp. 25
John Beall Company 139
Beehive International 17
BMC Software 97
Braegen Corporation 155
Brum-Ko Magnetics Corp. ID/48
M. Bryce & Associates 42
Burroughs 23

Cambridge Systems 134
Chubb Institute of Advanced 106
Cincom Systems 20-21
CMI Corp. 13
Codex Corporation 60,61
Communications Electronics 123
Comnet 59
Computer Data Corp. 8
Computer Management Research ID/22
Computerworld Supplement ID/34
Control Concepts ID/33
Control Data Corporation 32
Cord Cable Co. ID/33
Core & Code, Inc 66
Corodale 91
CPI 16
Cromemco, Inc. 124-125
CRWTH Computer Coursewares 142
Curtis 1000 ..... ID/32
CW On Communications 150
Cyborg Systems 58

Dallas Market Center 40
Data Centre Management Services 12
Data General 110-111
Datamation 32
Data Processing Design 19
Dataproducts 54
Datapro Research 39
Dataroyal 41
Datasphere ID/9
Datastream 107
DDR 33
Decision Point '83 160
Deltak/Goal Systems 120-121
Deltak/Micros 65
Diablo Valley Publishing 35
Digital Equipment Corp./
—Large Computer Group 68-69
Digital Equipment Corp./
—NPN VAX ID/12-ID/13
Digital Equipment Corp./
—Professional PC 132-133
Digital Pathways ID/6
Digital Research 30
Direct Inc. 70
D.J.C. Corporation 26
Dysan Corporation ID/46

Eastman Kodak Co. ID/21
EEC Systems 16
Electrohome ID/44-ID/45
EMC Corporation 50
EMCE 114-115
Enterprise Technology ID/10
ESPN 62

Fingraph 128
Formscan ID/17
Forte Data Systems 22
Four Phase Systems 38
Fusion Products ID/17

Gejac, Inc 34
General Electric 118-119
General Research Corporation 100
Genesys Software 90
Gould Inc. 158
Graham Magnetics ID/11
Group Operations 137
GTE Telenet 113

Hambrecht & Quist 122
Hitachi 102
Honeywell Info. Systems ID/24-ID/25
H&W Computer Systems 34

IBM-ISG 126-127
Industrial Comp. Co. 63
Informatics 48-49
Information Builders 24
Infotron 82
Innovation Data Processing 7
Innovative Electronics 155
Integral Data Systems 145
Intel-DataBase Operations 92-93
Intel Systems Operations ID/31
International Power Machines 94
IPL Systems ID/20
ITT Courier 86

J.W. Lampi, Inc. 96
Laminex 112
Lear Siegler 36-37
Lee Data Corp. 84-85

3M Company ID/29,74
Management Science America 208
Martin Marietta ID/47
MCBA ID/7
M&F Case Co. ID/36
M&G Software, Inc. 104
Microcom ID/36-ID/37
MicroFrame 106
Micro Learning Co. ID/29
Micro-MainFrame, Inc. 63
MPC ID/14-ID/15,67

National CSS 96
National Information Systems 66
NBI ,Inc. 46-47
National Computer Communications Corp. ID/39
NCR Corporation 55
NEC ID/30
North Star Computer 51
Northern Telecom 108-109
Northwest Digital Systems 104

Omni Offices, Inc. ID/32
On-Line Software 136

PC World 146
PE International 122
Plexus Computer ID/22-ID/23
Popcom 95
Precision Visuals 57
Professional Software 6

Quadrum Corporation 140-141
Qume 35

Radio Shack 83
RAMTEK 142
Raytheon Computer Services 87
Raytheon Data Systems 156-157
Renex ID/9
Rogue River Software ID/16
Roundtable 153

SAS Institute 99
SDM-Corporate Products & Services 59
Siggraph'83 147
Signal Technology Inc. 66
Softool ID/8
Software AG 101
Software Corp. of America 103
Software House 98
Software International 151
Sohio Petroleum ID/38
Southern Systems 31
Sperry Univac 138
SPSS, Inc. 116
Syncsort 3
SysEd 32,106
Systems Strategies 106

TAC-EDP Temps ID/48
T-Bar 152
Teledyne/Inet 18
Teletype Corp. 44-45
Televideo-Small Computers 89
Televideo-Terminal Div. 52-53
Texas Instruments 28-29
Tone Software 16
Topaz Inc./Electronic Div. ID/16
Tower Systems, Inc. 88
TRW 154
Tymshare 31

United Telecom 130
Unitronix Corp. 117
Universal Data Systems 27
University Computing ID/28
USENIX Association 71
US Postal Service 56

Verbatim 129

Wang Laboratories ID/1,143
Wells Fargo Bank ID/39
Western Union F.S. 43
Westwood 153
Wolfe Computer Testing ID/28
Wright Line 131

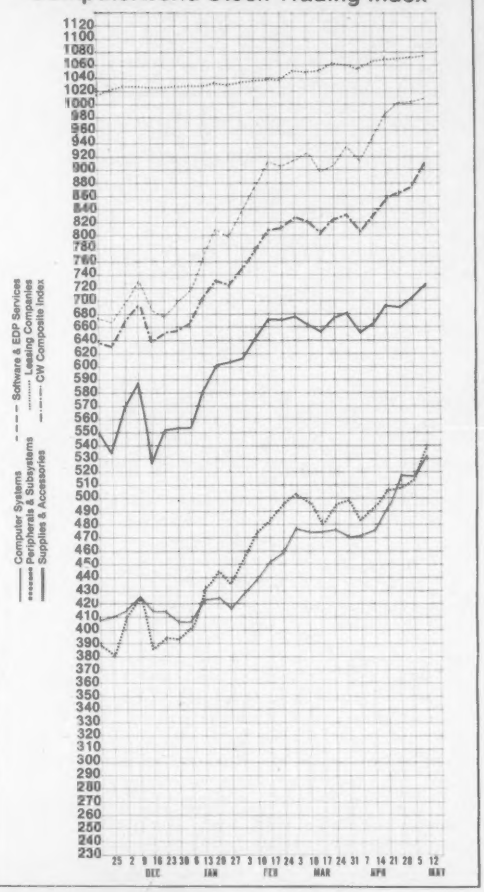
Xerox Corporation 14-15
Xerox Printing Systems 144

Yourdon 5
Yourdon Press 9

Zenith Data Systems 159
Zilog Inc. 100
Zytron ID/10

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Chris Lee
Sr. District Manager/Ed Marecki, Jr.
District Managers/Joe Fitzhugh, Jim McClure
Sales Assistant/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, H. Newton Barrett, III
Sales Assistant/Jean F. Broderick
COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Manager/Mike Masters
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly
Account Executive/Fred Lo Sapio
Sales Assistant/Gale M. Paterno
COMPUTERWORLD, Paramus Plaza I, 140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 556-6480
Regional Manager/Jim Richardson
District Manager/Bob Hubbard
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260, Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Manager/William J. Healey
Account Managers/Barry Milione, A.G. Germano, Theodora Franson
Account Manager, Classified/Eileen Dunn
COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Manager/Michael Masters
COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMille, Bill Cadigan
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

For foreign sales offices, see masthead on Page 2.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmer

Group VP-Communication Services, Jack Edmonston. **Group VP-Circulation,** Margaret Phelan. **VP-Marketing,** Roy Einreinhofer. **VP-Sales,** Donald E. Fagan. **VP-Finance,** William P. Murphy. **VP-Editorial,** John Whitmarsh. **VP-Special Publications,** Robert Ziegel.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701 Phone: (617) 879-0700, Telex: 95-1153.

SALES **Vice-President,** Donald E. Fagan. **Corporate Advertising Administrator,** Frank Collins. **Display Advertising Supervisor,** Anne Hadley. **Display Advertising,** Tracey Eastman, Pam Valentinas, Laura Kentley, Alice Longley. **Classified Advertising Manager,** William J. Mills.

COMMUNICATION SERVICES **Group Vice-President,** Jack Edmonston. **Director Research,** Kathryn Dinneen. **Sales Promotion Manager,** Noreen Kimball.

PRODUCTION **Production Director,** Peter Holm. **Production Manager,** Marlene Stibal. **Supervisor,** Trish Gaudette. **Systems Manager,** Tom Pfau. **Typesetting Manager,** Carol Polack. **Art Director,** Tom Monahan.

CIRCULATION **Group Vice-President,** Margaret Phelan. **Circulation Manager,** Barbara Jeannetti. **Service Representative,** Peggy Kelly. **Assistant,** Carmela Priante.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, MAY 11, 1983

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		PRICE 1982-83 RANGE (1)	PRICE CLOSE MAY 11 1983	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	17- 51	48 1/8	+ 1/2	+1.0
N	BURROUGHS CORP	28- 52	50	- 3/4	-1.4
O	COMPUTER AUTOMATION	7- 17	12 1/2	+1 1/8	+8.8
A	COMPUTER CONSOLES	15- 44	42	+3 1/4	+8.3
N	CONTROL DATA CORP	21- 54	54	+6 1/8	+12.7
N	CRAY RESEARCH INC	20- 48	41 7/8	-1 5/8	-3.7
N	DATA GENERAL CORP	20- 73	58 3/4	-5 1/8	-8.0
N	DATAPOINT CORP	11- 36	20 3/8	+1	+5.0
N	DIGITAL EQUIPMENT	62-132	113	-2	-1.7
A	ECCO INC	8- 14	13 3/4	+ 3/4	+5.7
N	ELECTRONIC ASSOC.	5- 12	10	+ 7/8	+9.5
N	FLOATING POINT SYST	16- 38	34 1/2	+3 1/2	+11.2
N	FONEBORD	22- 43	36 3/4	- 5/8	-1.6
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 12	11 1/2	+1 3/8	+13.5
N	HARRIS CORP	20- 51	44 1/4	+1 7/8	+4.4
N	HEWLETT-PACKARD CO	38- 87	78 1/4	+3 1/4	+4.2
N	HONEYWELL INC	85-123	121 1/8	+2 3/8	+2.0
N	IBM	57-118	115 1/2	-1	-0.8
O	IPL SYSTEMS INC	5- 11	8 1/4	+1 1/2	+18.3
O	MAGNUSON COMP SYSTS	2- 5	3	0	0.0
N	MANAGEMENT ASSIST	7- 18	14 3/4	0	0.0
O	MINI-COMPUTER SYST	1- 2	1 7/8	- 1/4	-11.7
N	MODULAR COMPUTER SYS	8- 15	13 5/8	+1 1/4	+10.1
N	MOHAWK DATA SCI	10- 18	15 3/8	- 3/8	-2.3
N	NCR	39-121	118 1/2	+3 1/8	+2.7
N	PERKIN-ELMER	17- 33	28 3/8	+ 3/8	+1.5
N	PRIME COMPUTER INC	18- 45	39 1/8	-2 1/8	-7.0
N	SPERRY CORP	21- 38	37 1/2	+ 7/8	+2.3
O	TANDEM COMPUTERS INC	14- 34	28 7/8	+ 1/2	+1.7
N	TEXAS INSTRUMENTS	71-178	151 1/2	+5 3/8	+3.8
A	WANG LABS "B"	13- 41	38 3/8	+1 1/4	+3.2
A	WANG LABS "C"	11- 41	38 5/8	+1 1/4	+3.2

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	22- 45	45	+3 1/2	+13.8
N	COMDISCO INC	7- 32	31 5/8	+2	+6.7
B	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	1/2	0	0.0
O	CONTINENTAL INFO SYS	5- 24	22 1/4	0	0.0
N	DPF INC	5- 14	13 1/8	+ 7/8	+7.1
O	ITEL	1- 3	1 1/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 47	45	-1 3/4	-3.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

E X C H		PRICE 1982-83 RANGE (1)	PRICE CLOSE MAY 11 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	4- 21	15	+ 1/4	+1.6
O	COMPUTER TRANSCEIVER	4- 12	11 1/2	+1 3/4	+17.9
N	COMPUTERVISION CORP	19- 45	41 3/4	+2 1/8	+8.0
N	COMREC CORP	21- 38	37	- 7/8	-2.3
A	DATA ACCESS SYSTEMS	1- 4	5/8	0	0.0
A	DATAPRODUCTS CORP	16- 41	23 1/4	+ 1/8	+0.5
A	DATRAM CORP	5- 12	10 1/8	+ 3/8	+3.8
O	DATUM INC	2- 13	13 1/4	+2 1/4	+20.4
O	DAVID JAMISON CARLYL	2- 7	3 1/4	+ 1/8	+4.0
O	DECISION DATA COMPUT	3- 14	13 3/4	+ 7/8	+6.7
O	DELTA DATA SYSTEMS	1- 4	4 1/8	+ 1/8	+3.1
N	ELECTRONIC M & M	5- 10	8 3/4	0	0.0
O	EVANS & SUTHERLAND	18- 50	41 3/4	- 1/2	-1.1
O	GANDALF TECHNOLOGIES	10- 22	14 1/4	+ 7/8	+6.5
N	GEN'L DATA COMM IND	6- 24	21 7/8	+1 7/8	+9.3
O	GENERAL TERMINAL CP	1- 2	3/4	0	0.0
O	GREAT SOUTHWEST IND	2- 6	2 1/4	+ 1/2	+28.5
N	HAZELTINE CORP	22- 78	77 3/4	+1 1/2	+1.9
O	ICOT CORP	3- 10	7 1/4	- 5/8	-8.5
O	INFORMATION INTL INC	10- 22	17 3/4	- 1/2	-2.7
O	INTEL CORP	21- 57	55 1/4	+4 3/4	+9.4
O	IPL SYSTEMS INC	5- 11	9 1/4	+1 1/2	+19.3
A	LUNDY ELECTRONICS	7- 16	15 1/4	+ 3/8	+2.5
A	MSI DATA CORP	14- 36	20 3/8	+ 7/8	+4.4
O	NETWORK SYSTEMS CORP	8- 27	26 3/8	+1 3/4	+7.1
O	OMEX	3- 8	5 1/2	+ 1/2	+10.0
N	PARADYNE CORP	20- 30	24 7/8	- 1/2	-1.9
A	PENRIL CORP	7- 13	11 3/4	+1 3/8	+13.2
O	RAMTEK CORP	12- 26	23 1/2	+2	+9.3
N	RECOGNITION EQUIP	4- 15	14 7/8	+1	+7.2
O	SCAN DATA	1- 3	1 1/8	- 1/4	-18.1
N	STORAGE TECHNOLOGY	16- 33	22 7/8	- 1/2	-2.1
O	SYKES DATATRONICS	6- 27	9 5/8	+ 1/8	+1.3
A	T BAR INC	7- 14	10 3/8	- 3/8	-3.4
A	TSI PRODUCTS CO	8- 27	27 1/4	+1 1/2	+5.8
A	TEC INC	6- 12	9 5/8	0	0.0
N	TEKTRONIX INC	34- 75	72 1/8	+4 7/8	+7.2
N	TELEX	5- 27	23 1/4	+1	+4.4
O	TESDATA SYSTEMS CP	3- 11	9 5/8	-1	-9.4
N	TIMEPLEX INC	7- 24	21 3/4	- 3/4	-3.3
O	VISUAL TECHNOLOGY	9- 24	24	+2	+9.0
O	WILTEK INC	1- 4	2 5/8	+ 1/8	+5.0

SUPPLIES & ACCESSORIES

N	AMERICAN BUS FORMS	11- 27	25 7/8	+ 1/2	+1.9
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	13- 27	26 7/8	+1 7/8	+7.5
O	CYBERNATICS INC	1- 1	1 1/4	0	0.0
A	DUPLEX PRODUCTS INC	12- 28	25 1/8	- 1/8	-0.4
N	ENNIS BUS. FORMS	16- 38	38 5/8	+1 7/8	+5.1
N	3M COMPANY	85- 96	96 1/4	+3 1/8	+3.3
N	MOORE CORP LTD	28- 51	51	+1	+2.0
N	WABASH CORP	9- 18	18	+1 1/4	+7.4
O	STANDARD REGISTER	32-100	98 1/2	+2 1/2	+2.5
N	WALLACE BUS FORMS	11- 28	26 1/2	- 3/8	-1.3

SOFTWARE & EDP SERVICES

E X C H		PRICE 1982-83 RANGE (1)	PRICE CLOSE MAY 11 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	5	+ 1/4	+5.2
O	ADVANCED SYSTEMS INC	9- 26	25 1/2	+1	+4.0
O	AGS COMPUTERS INC	7- 24	21 3/4	+1	+4.8
O	AMERICAN SOFTWARE	22- 29	27 3/4	- 1/2	-1.7
N	ANACOMP INC	9- 23	20 1/8	0	0.0
O	ANALYSTS INTL CORP	5- 11	10 1/2	+ 3/4	+7.6
A	APPLIED DATA RES.	8- 32	31 3/4	+1 3/8	+4.5
O	ASK COMPUTER SYSTEMS	12- 36	32 1/4	+ 3/4	+2.3
B	ASTRADYNE COMP IND	1- 6	5 5/8	+ 1/2	+9.7
N	AUTOMATIC DATA PROC	21- 42	41 1/2	+3 3/4	+9.9
O	CGA COMPUTER ASSOC	5- 14	13 1/2	+1 1/4	+10.2
O	COMPUTER ASSOC INT'L	12- 60	60	+6 1/2	+12.1
O	COMPUTER HORIZONS	8- 22	22	+2 1/2	+12.8
O	COMPUTER NETWORK	4- 10	10 1/8	+ 3/4	+8.0
N	COMPUTER SCIENCES	11- 23	19 1/2	+2	+11.4
O	COMPUTER TASK GROUP	8- 22	22	+1 1/4	+6.0
O	COMPUTER USAGE	2- 22	18 3/4	+3 1/4	+19.8
O	COMPUTONE SYSTEMS	15- 38	21 1/2	-1 1/4	-5.4
O	CONSERV CORP	10- 20	13	+ 3/4	+6.1
O	COMSHARE	6- 13	10 1/2	+ 1/4	+2.4
N	CULLINET SOFTWARE	12- 42	42 1/4	+3 1/4	+8.3
O	CYCARE SYSTEMS INC	9- 24	24	+2 3/4	+12.9
O	DATA DIMENSIONS INC	1- 2	3/4	0	0.0
O	DATATAB	0- 2	3/4	0	0.0
O	DYATRON CORP	2- 4	3	- 1/8	-4.0
N	ELECTRONIC DATA SYST	18- 65	63 1/4	-2	-3.0
N	INFORMATICS INC	10- 31	30 1/4	+1 5/8	+5.6
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 13	11 3/4	0	0.0
A	LOGICON	12- 38	37 1/4	0	+0.0
O	MGT SCI AMER INC	8- 31	30 1/2	+4 1/2	+17.3
O	MATHEMATICA INC	12- 25	24	+2	+9.0
O	MATHEMATICAL APP GRP	12- 22	18 3/4	- 3/4	-3.8
O	MATHEMATICS DATA CORP	5- 28	24 3/4	+1	+4.2
O	PANSOPHIC SYSTEMS	8- 25	23 3/4	- 3/4	-3.0
N	PLANNING RESEARCH	6- 18	18	+1 1/8	+6.6
O	POLICY MGMT SYSTS CP	36- 58	52	+1	+1.9
O	PROGRAMMING & SYS	1- 4	3 1/4	0	0.0
O	REYNOLDS & REYNOLD	17- 46	43 1/2	0	0.0
O	SEI CORP	11- 32	32 1/4	+ 1/4	+0.7
O	SHARED MEDICAL SYST	13- 37	35	-1 7/8	-5.0
O	SCIENTIFIC COMPUTERS	6- 13	12	+ 3/4	+6.6
O	SOFTWARE AG	5- 17	9 3/8	+ 5/8	+7.1
N	TYMSHARE INC	12- 30	23 1/2	+3 3/4	+18.9
A	UNI CORP	5- 14	13 1/2	+ 1/2	+3.8
N	WYLY CORP	7- 13	12	- 3/8	-3.0

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	2- 8	5 3/4	+ 1/2	+9.5
A	ANDERSON JACOBSON	8- 28	20 1/2	0	0.0
O	AUTO-TROL TECHNOLOGY	8- 21	17 7/8	+4 1/8	+30.0
O	BANCTEC INC	7- 33	16 1/4	+ 1/2	+3.1
A	BEEHIVE INT'L	4- 15	14 1/4	+2 7/8	+25.2
A	BOLT-BERANEK & NEW	13- 51	50 3/4	+4	+8.5
O	CAMBEX CORP	2- 4	2	+ 1/8	+6.6
N	CENTRONICS DATA COMP	8- 21	18 3/4	+ 3/4	+3.8
A	CETEC CORP	4- 10	8 1/4	+ 5/8	+7.2
O	COGNITRONICS	2- 14	11 1/8	0	0.0
O	COMPUTER COMMUN.	1- 2	1 3/4	0	0.0

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is *the* software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

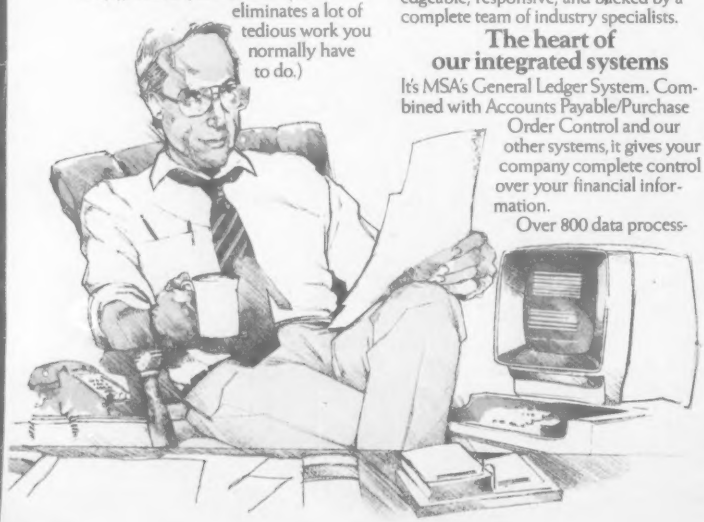
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install applications software
1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Foreign Exchange
9. Inventory & Purchasing
10. Payroll
11. Personnel Management & Reporting
12. ALLTAX™ Taxing System
13. ALLTAX Reporter™
14. Manufacturing Control System (MRP II)
15. Executive Peachpak™
16. Peachtree Software™ business systems for microcomputers
17. Peachtree Software™ office productivity systems for microcomputers

ALLTAX, ALLTAX Reporter, EASY-SCREEN, Executive Peachpak, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list)

_____

Mainframe Computer Type/Model _____

_____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone (___) _____

CW17a(5/16/83)

MSA
The Software Company